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ESOPHAGOSCOPY AND GASTROSCOPY[1]

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THE object of the present paper is to place upon record our own experience in a limited number of esophagoscopic and gastroscopic examinations with the hope that it will be viewed as the beginning of an attempt which is being made by us to develop esophagoscopy and gastroscopy into procedures of greater diagnostic value.

Esophagoscopy is already a method of examination of recognized value. The work of Chevalier Jackson and Plummer in this country has done much to demonstrate its worth.

Gastroscopy, on the other hand, cannot be said to enjoy the same reputation. For the past fifteen years one worker after another has attempted to develop the technique and, notwithstanding the latest rather notable achievements abroad, and again by Chevalier Jackson in this country, it is far from being a method of examination often resorted to or even encouraged. There is a real justification, therefore, for the skeptical attitude regarding its possibilities. Nevertheless, to successfully examine the interior of the stomach is so desirable that attempts to solve the problem justify an unusual amount of persistence. The high death rate from carcinoma of the stomach should be a matter of concern to every physician and surgeon. Cancer of the stomach is, for both sexes considered together, the most frequent form of malignant disease, forming twenty per cent of all such cases. (14,468 cases of cancer of the stomach, exclusive of those of the esophagus, are reported by Bashford out of a total of 84,448 cases of cancer occurring in Great Britain and Wales during three years.) The proportion of cured cases to the total number of gastric carcinomas is very small. Nevertheless, a sufficient number of cases have been permanently cured by operation to demonstrate not only that the disease can be extirpated, but also that it lends itself favorably to a successful removal, if attacked at an early period in its growth. Kocher, out of ninety-two resections, has obtained eighteen cases which have remained well over three years, and Mayo has reported eighteen cases well over three years out of eighty-eight traced cases among one hundred and seventeen resections. Unquestionably, therefore, the most important consideration in the cure of cancer of the stomach is its early diagnosis. If it were possible to recognize the disease as easily as cancer of the breast, the responsibility for failure

[1] Under the auspices of the Cancer Commission of the New York Hospital. Read before the New York Surgical Society.

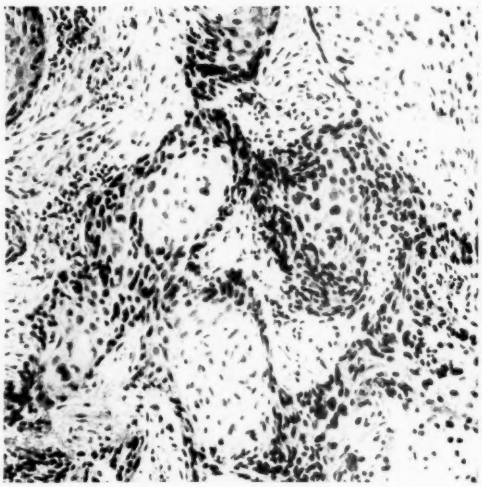
I. From case 6. Epithelioma in lower third of esophagus.

II. From case 4. Cardiac carcinoma seen through the partially dilated cardiac sphincter.

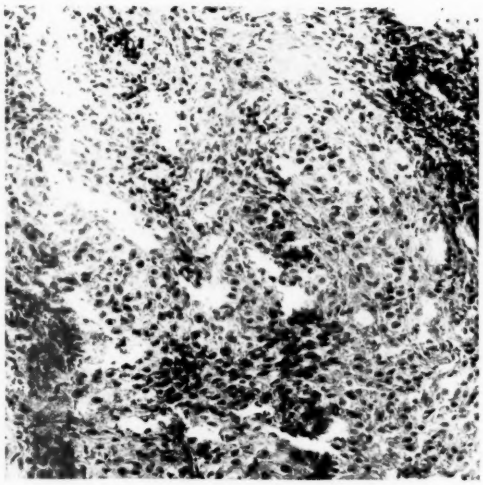
III. From case 5. Carcinoma of cardiac portion of the stomach.

IV. From case 10. Carcinoma some distance within stomach.

V. From case 11. Entrance to the pyloric region of the stomach as viewed through an indirect telescope inserted 3 to 4 inches within stomach.



Section No. 1 from case No. 3. Epithelioma of middle one-third of the esophagus.



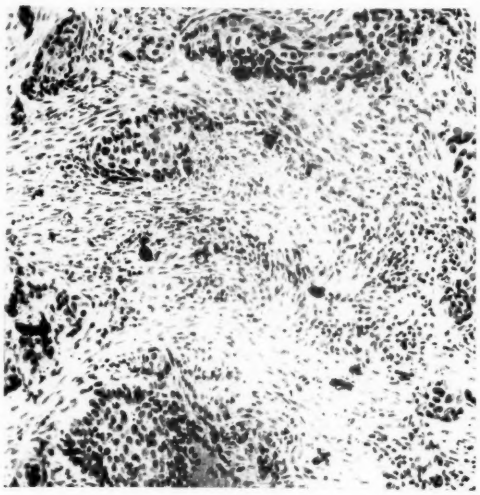
Section No. 2 from case No. 6. Epithelioma of lower one-third of the esophagus.

to cure it would rest with the laity and not, as at present, with the physician. As it is, however, there is an almost universal failure to diagnose cancer of the stomach in an early stage. A palpable tumor usually exists when the disease is first recognized; and this condition of affairs is rather a reproach to medicine. It will indeed be a great boon to humanity when a specific reaction for the recognition of cancer is available. One after another of the various tests of a greater or lesser degree of specificity thus far advanced have proved disappointing, and it is questionable whether the peculiar nature of cancer, being with such a strong probability a non-parasitic disease, will not preclude the existence of a specific reaction in its early stages. The latest of these tests, the glycyl-tryptophan and the meiostagmin reactions, have not yet been thoroughly tested, though the latest reports are not so encouraging as those which were first published.

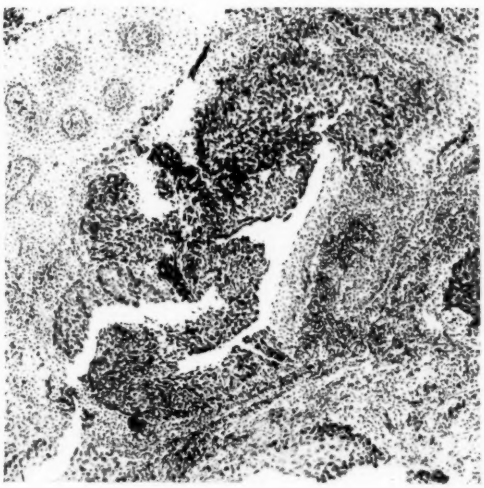
Of the cases which we have examined, we have regarded only twenty-seven as worth recording, but should estimate that, all told, we have made fifty examinations. Of the number tabulated, thirteen were lesions of the esophagus and fourteen lesions of the stomach. Of the esophageal lesions two were cicatricial stenoses, both situated in the upper part of the esophagus, and eleven were epitheliomas, divided as follows: two in the upper third, five in the middle third, and three at the cardiac portion of the esophagus with obstruction in the lower third. One at autopsy proved to be a diffuse infiltration of a considerable length of the esophagus.

The stomach lesions, with two exceptions, were all carcinomas. In the case of one of the two exceptions the gastroscopic examination showed a normal mucosa while at operation a carcinoma was found involving the intestine. The second exception was a very interesting case. We were permitted to make two examinations. At the first examination a definite nodular ulcerated mass was discovered which was thought to be carcinoma, but the small piece removed for microscopical examination showed no malignancy. Subsequent to this examination the patient's condition improved materially, and at the second examination at the site of the previously discovered lesion an appearance resembling a cicatrized area was found, so that it was assumed that the patient had a healed ulcer. He left the hospital much improved.

The other twelve cases were all carcinomas. Two were situated near the pylorus and were



Section No. 3 from case No. 20. Epithelioma of lower one-third of the esophagus.

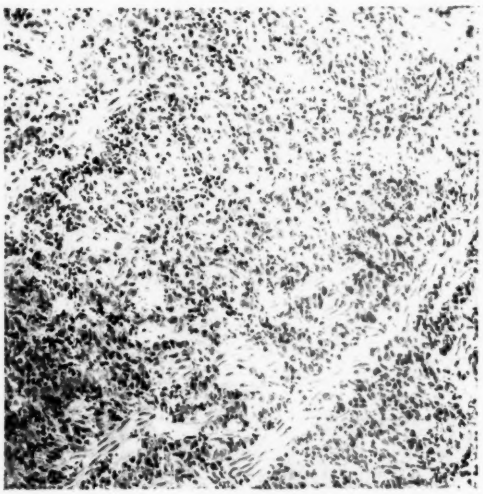


Section No. 4 from case No. 18. Basilar type of epithelioma of the cardiac portion of the esophagus.

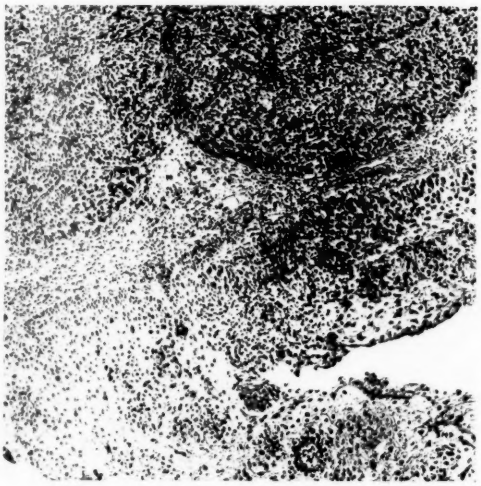
missed entirely by the gastroscopic examination. Ten were limited entirely to, or involved in part, the cardiac portions of the stomach. All these growths were of considerable size. In all of these cases we were able to make a diagnosis.

This series is, of course, small; nevertheless we believe that it demonstrates or confirms the previous demonstration of a number of facts of some importance. The first of these facts concerns the amount of discomfort experienced in a gastroscopic examination conducted under local anæsthesia alone. If it is necessary to administer a general anæsthetic in order to make a gastroscopic examination, the procedure will not prove so valuable. Though a gastroscopic examination conducted under a general anæsthetic is less objectionable from the standpoint of the patient than an exploratory laparotomy, yet it becomes at once a far more radical step to which the consent of the patient must be asked than the same examination under local anæsthesia. We have relied in the examinations which we have made entirely upon a hypodermic injection of one-fourth of a grain of morphine, and by mouth five grains of anæsthesin, and finally a thorough anæsthetization of the pharynx with a ten per cent solution of cocaine.

Following this technique the degree of discomfort experienced has not been regretted by any of the patients examined. We have only followed this technique lately since we have begun to tabulate our cases. Before this time a number of patients complained bitterly, and particularly was this true when we were learning to easily pass the instrument. In fact, we may have been responsible for the death of one patient whom we examined in the very beginning of this work. This patient died, ten days after the examination, of an unrelieved retropharangeal abscess. We should never, however, again fear this complication. It has been the only ill consequence other than a temporary discomfort in the pharynx following an esophageal or gastroscopic examination that we have experienced. We have tried to be particularly careful in forming an opinion upon this point because it concerns the objection which is raised against gastroscopy as a routine procedure. All the patients in this series were questioned as to the degree of discomfort which they experienced. To a number of them the examination was less objectionable than the withdrawal of a test meal, but by many considerable discomfort and by a few some actual pain was experienced. None however, regretted having con-



Section No. 5 from case No. 4. Carcinoma of cardiac portion of the stomach.

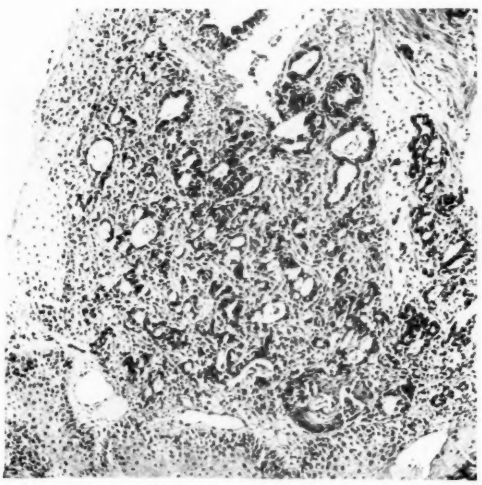


Section No. 6 from case No. 7. Carcinoma of cardiac portion of the stomach.

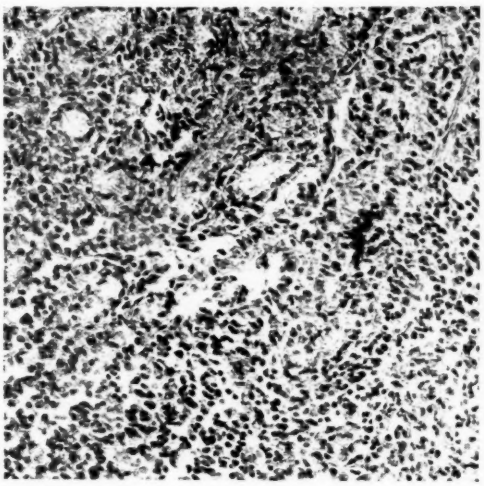
sented to the procedure and all expressed themselves as willing to undergo it again if it would do them any good. A number of patients have been examined two or even three times. One patient included in this series, who after the examination definitely expressed himself as willing to undergo another examination if necessary, and upon whom at the first time we demonstrated the existence of carcinoma of the stomach, has since been heard from at an interval of a number of months. Not understanding the nature of his malady, and becoming steadily worse, he dates and, we are inclined to think, attributes his becoming worse to the examination, and we have since learned that he speaks in a very different manner about it.

Concerning any possible dangers of a gastroscopic examination, we have already mentioned a possible serious outcome, but one which need not again be repeated. As related above, this has been the only consequence more serious than a temporary discomfort in the throat. We do not believe that there can be the slightest injury to the stomach for the end of the instrument is never inserted within the cavity of the stomach or moved around within the stomach without being under constant observation by the eye, and it is difficult to see how in this manner any serious injury to the mucosa can result.

Concerning the amount of the stomach which it is possible to examine, we have been able to cover fairly thoroughly the cardiac portion. There is considerable doubt whether we have ever been able to see the pyloric region. On one occasion upon which we were under the impression that we had seen particularly well into the stomach, we failed to discover a carcinoma of considerable size situated in the pyloric region and involving part of the lesser curvature. In this case it was not determined by operation whether the tumor was ulcerated or not, and it is not unlikely that we may have been looking at a non-ulcerated portion of the tumor and failed to recognize it. Many gastric carcinomas are not ulcerated until quite a late stage, and it may be impossible to recognize such growths by gastroscopy or, at least, not until the knowledge of how to interpret what is seen has advanced much further. In fact, at the present time we believe it better in all except a certain class of very apparent lesions to make a diagnosis only by the microscopical findings of the small portion of the tissue which is removed at the examination. It should always be possible to remove such a piece from lesions



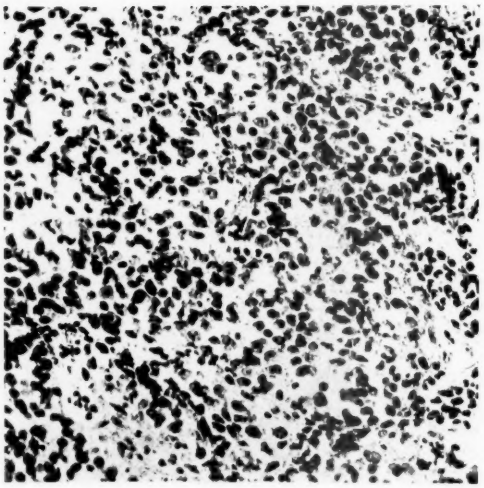
Section No. 7 from case No. 17. Carcinoma of cardiac portion of the stomach.



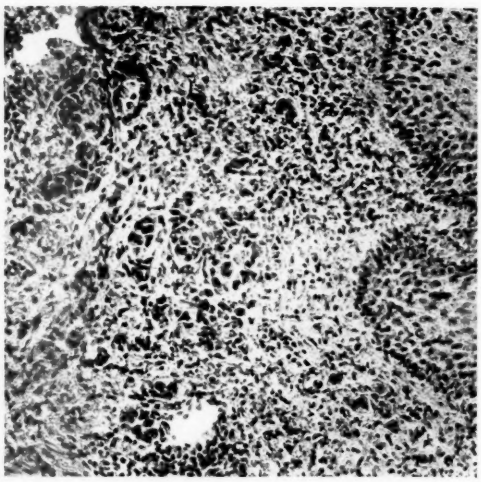
Section No. 8 from case No. 21. Carcinoma of cardiac portion of the stomach.

of the esophagus and from gastric carcinoma situated near the cardiac orifice, unless the growth has extended underneath the mucous membrane so high that an indurated stenosis exists above the tumor, thereby preventing its proper exposure. The earlier the lesion the more easily it should be detected in the location of which we are speaking, but the farther the lesion is within the stomach the more difficult it is to see. As a result of our experience thus far we believe that it is possible to cover the whole of the stomach except the pyloric portion. Photographs to be referred to later will demonstrate the excursions of the end of the gastroscope within the stomach. Should subsequent experience prove that it is not possible to view the pyloric region, what is possible within the cardiac end will fully justify gastroscopy. The cardiac tumors are the very ones which remain for so long a time latent and are so difficult to palpate. It is fortunate that they are so easily within reach of the gastroscope.

In contrast to them the pyloric growths, though at the present time beyond our reach with a gastroscope, are most easily palpated through the abdomen and generally give rise to subjective symptoms early in their course. It is fortunate that at least eighty per cent of cancers of the stomach begin in the pyloric region. Remembering the high percentage of carcinomas which affect the stomach, the twenty per cent near the cardia form by no means a small number of growths. Indeed of those which we have seen during the past year, the majority have been near the cardiac extremity. The importance of recognizing them early even when they extend up within the esophagus doubtless seems greater to us, inasmuch as we have previously described an operation for their radical removal and believe that such can be successfully accomplished. These tumors are characterized by a long latent period and often the first symptoms attributed to them is dysphagia, but careful questioning will usually elicit the fact that there has been some previous symptoms which the patient has neglected. Case 21 of the series here reported well illustrates this fact. The patient first noticed dysphagia six weeks before entering the hospital, and this difficulty was supposed to be his first symptom. At the time of his examination it was so stated in the history taken at the hospital, and it was positively stated to us at that time that he had been in good health until dysphagia had developed. We were able to diagnose a carcinoma of the stomach by the removal of a small piece for mi-



Section No. 9 from case No. 5. Carcinoma of the stomach situated some little distance within the cardia.



Section No. 10 from case No. 24. Carcinoma of cardiac portion of the stomach.

croscopical examination and the patient submitted to an exploratory laparotomy. A very extensive and irremovable growth was found. After this, in a letter received from his family physician, it was stated that he had never really regained his normal health following what was diagnosed at that time as an attack of pleurisy a year and a half previous. In other words, cardiac carcinoma in its early stages may give rise to no symptoms, or to symptoms referable to some other organ or merely be characterized by an ill-defined condition of poor health. These characteristics are very important ones as they have a direct bearing upon our opportunities of radically removing the trouble. Where distinctly gastric symptoms are present it is hardly justifiable to allow a patient to go on until the presence of a mass confirms or makes the diagnosis, and yet comparatively few carcinomas of the stomach are operated upon until a mass is perceptible. In other cases in which an ill-defined condition of poor health is present, or in which symptoms point to disease of some other organ, but such disease cannot be established, the frequency of cancer of the cardiac portion of the stomach is sufficient to warrant a gastroscopic examination, and we believe if such examinations were encouraged more than they now are, that cancers of the stomach would be recognized earlier. Medicine should diagnose cancer of the cardiac portion of the stomach before it involves the cardiac sphincter.

The question, therefore, suggests itself whether it is justifiable to make of gastroscopy a routine procedure. Perhaps we cannot yet answer this question in the affirmative, but we are disposed to believe that the evidence herein presented indicates that cardiac carcinoma can be recognized in an early stage by direct examination and the removal of a small piece of the growth for microscopical examination, without an amount of discomfort to the patient which he or she would resent. Of the twelve carcinomas of the stomach which are reported in this paper, we have failed to see the growth only twice. In both of these cases the tumors were in the pyloric region. In six of the remaining ten cardiac growths we have been able to remove portions of tissue which microscopical examination showed to be malignant.

The gross appearances are often typical, and a diagnosis based upon them alone would seldom be in error particularly in cardiac cancer. The pictures I, II, III, IV painted from the cases 6, 4, 5, and 10, reported in this series,

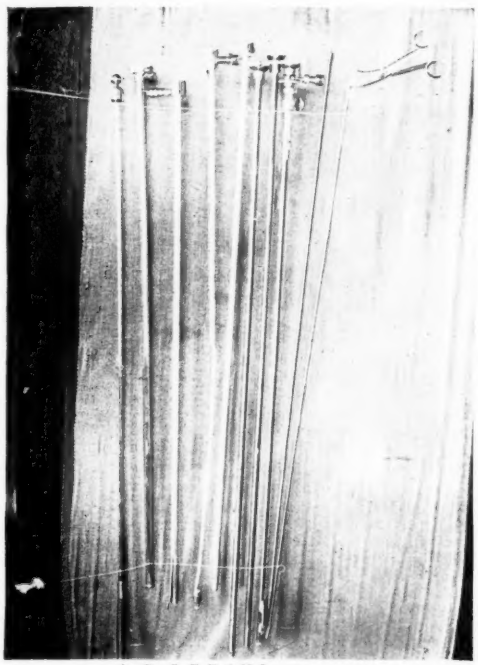


Fig. 1. Instruments used in examination of esophagus and stomach.

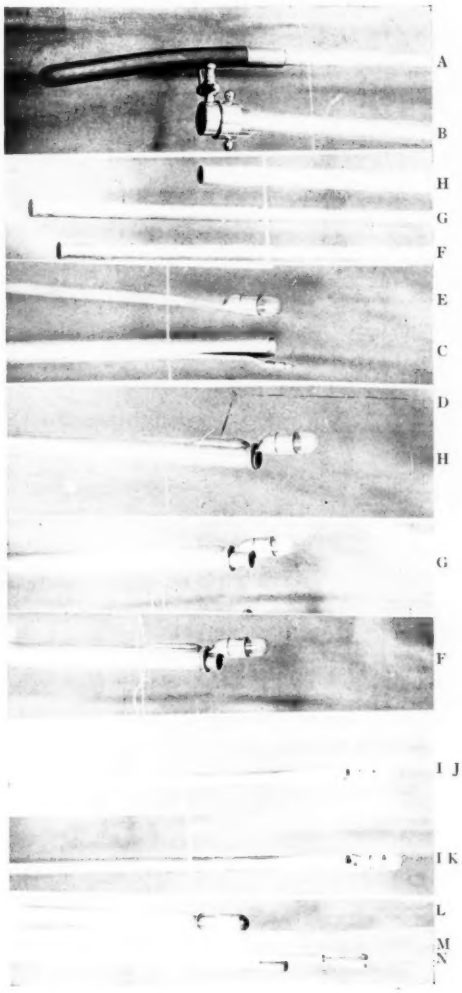


Fig. 2. Ends of instruments shown in Fig. 1, enlarged. B, Proximal end with eye piece used in distending the stomach.

illustrate these appearances. No. 1 is a painting from case 6, an epithelioma of the lower third of esophagus. No. 2 shows a cardiac carcinoma seen through the partially open cardiac sphincter. Nos. 3 and 4 are taken from cases 5 and 10 of this series and show lesions situated farther within the stomach. While the lesions figured are all fairly typical, yet the confirmation of the diagnosis by the removal of a piece of tissue for microscopical examination is always desirable and often necessary. A number of the sections of the pieces so removed in the present series of cases have been reproduced in order to demonstrate how real is the possibility of securing a satisfactory piece of tissue for microscopical examination. The first three sections are from cases 3, 6, 20, and 18, all epitheliomas of the middle of the esophagus. Section 4, from case 18, is an epithelioma of the cardiac portion of the esophagus and represents a different type of epithelioma than the ordinary cell growth. It suggests the basilar type of growth occurring so often in the skin, and hence should offer a peculiarly favorable prognosis. In none of them should the diagnosis be in doubt. The remaining sections are from cases 4, 5, 7, 17, and 21, and are all carcinomas of the cardiac portion of the stomach. The diagnosis of one of these sections has been questioned, but Dr. Ewing has lately examined

Fig. 3. End of instrument in cardiac region of stomach, knees out straight.

Fig. 4. End of instrument in cardiac region of stomach, knees flexed, throwing instrument more anterior.

them all including another section from case 24, and agrees that in all of them there is sufficient malignant tissue present to enable one to be sure of the diagnosis.

Figs. 1 and 2 illustrate the instruments which we have been using. The enlarged ends of the more important of these are seen in Fig. 2. We desire to call particular attention to four features. First, the obturator "A" with the long flexible rubber tip which fits inside the main tube "B" and aids its introduction. It is withdrawn after the main tube has been passed well into the esophagus and is replaced by the thin lamp bearing tube "C" upon which, it will be noticed, the little lamp is attached to a split-off portion of this tube and springs out. After introduction it fills the recess "D" of the main tube.

The latter forms the second feature and permits the use of the entire lumen of the main tube without necessitating the lateral grooves on the outside surface of the main tube. It is certainly an advantage to dispense with these grooves and to use only a tube perfectly round on cross section. The third feature is the second spring lamp "E," which is as large as the lumen of the main tube and gives a great deal of light. It is so arranged that after being introduced beyond the end of the main tube it is easily sprung away from the end of the latter by either a direct "F" or indirect telescope "G," introduced after it, or, even, by a second hollow operating tube, "H." The spring to which this lamp is attached always causes it to spring back in front of the lumen of the main tube after the telescopes have been removed. It can thus easily be withdrawn without pinching the mucous membrane. The fourth feature is the instrument "I" which is a compound telescope giving either the direct "J" or indirect view "K." The change from the indirect to the direct is accomplished by the movement of a prism in front of an indirect lens. We are not entirely satisfied at present as to the value of this compound instrument. In fact just how valuable any lens system is for viewing the interior of the stomach is still open to debate.

Fig. 5. End of instrument near pyloric region of stomach, knees out straight.

Fig. 6. End of instrument near pyloric region of stomach, knees flexed, throwing end of instrument more anterior.

We have obtained some very satisfactory views through our telescopes. One of them represented in Plate V, previously referred to, shows a view obtained through an indirect telescope "L," an instrument of considerable utility introduced three to four inches within the distended stomach. We hope with the further development of our technique to make more and more use of lenses. Up to the present time, however, we have placed greater dependence upon the simple straight operating tube. It is possible to quickly cover a large portion of the stomach.

The photographs 3, 4, 5, and 6, taken upon the cadaver, illustrate the excursions of the end of the tube within the stomach. They show the difference in the greater ease with which the tube can be moved about when the knees and thighs of the patient are flexed. Letter "M" indicates the forceps used for removing pieces from within the stomach for microscopical examination, and "N" the end of an aspirating tube for removing excessive secretions when such become troublesome.

THE MERITS OF SUPRAPUBIC PROSTATECTOMY

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THE male lower urinary tract serves a dual function in being the outlet for the excretion of the kidneys and the secretion of the testicles. The prostate occupies a position at the "crossing of the ways"—it might be termed the "urogenital turnpike." Therefore, two physiological considerations are present instead of one, when prostatectomy for urinary obstruction is contemplated. They are: removal of the obstruction in such manner as to insure voluntary control of micturition, and to guard against an obstruction being traumatically produced to the outlet of the semen.

The operation which fulfills these requirements with the most certainty and least risk to the patient is the ideal prostatectomy.

In presenting the merits of suprapubic prostatectomy I deem it expedient to outline the details of technique which have influenced its selection.

Before doing so, however, craving your indulgence, a review of the anatomical relations of the normal prostate is pertinent, as the changes produced in them by hypertrophy of the gland have a direct bearing upon this method of removal.

Plate 1 shows these relations more or less diagrammatically.

The prostate is invested near the apex to its basal bladder attachment by a sheath formed by the rectovesical fascia. The prostatic plexus of veins is contained within the layers of this sheath.

The sheath is in relation anteriorly with the triangular ligament and posteriorly blends into the wall of the bladder.

Within this sheath, fibers continuous with the compressor urethræ muscle encircle the apex for a short distance and then pass upward along the pubic surface of the gland, where the muscle is apt to be well developed. The base of the prostate is in relation to the internal vesical sphincter muscle.

The external longitudinal muscle of the bladder is attached to the capsule of the prostate, and fibers of the internal longitudinal muscle pass into the wall of the urethra. A prominent bundle of fibers of the internal

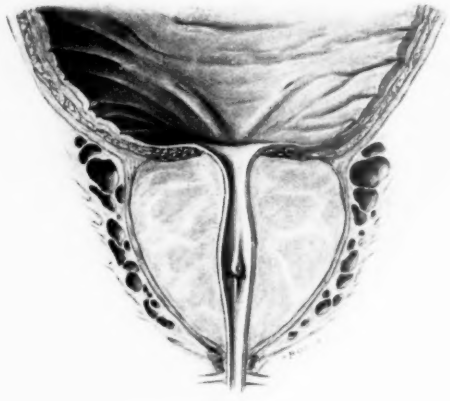

Fig. 1. Diagrammatic relations of normal prostate. Internal vesical sphincter in apposition to base of prostate.

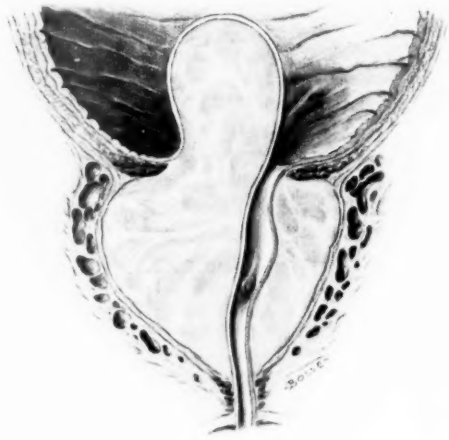

Fig. 2. The normal relation of the internal vesical sphincter altered by prostatic hypertrophy and lying outside the prostate.

coat passes downward from either ureter and unites with the other at the anterior apex of the trigone.

The true capsule is the connective tissue covering the gland, which is continuous with the stroma and does not easily separate from the lobes. This capsule invests each lobe separately.

The ejaculatory ducts pass between the lobes of the prostate below the urethra, and open into it at the sides or in front of the colliculus.

The urethra anterior to the colliculus is practically free from the prostate, but posterior is quite intimately attached, being pierced in this region by the prostatic ducts.

The normal prostate is, therefore, an extravesical organ, but when the phenomenon of hypertrophy takes place this relation is distorted and the gland may partake of an extravesical and an intravesical portion.

Plate 2 shows a condition probably brought about as follows: the hypertrophy, taking the line of the least resistance, pushes into the vesical cavity between the internal sphincter muscle and the bladder mucous membrane. The enlargement progressing, the normal relation of the base of the prostate lying in apposition to the internal sphincter disappears and this muscle then lies outside the prostate.

In hypertrophied prostates which have been removed en masse (Plate 3), a groove may sometimes be seen which has been produced by constriction from the internal sphincter muscle distinctly marking the division of extra- and intravesical portions.

Enlargement is rarely symmetrical in both lobes and multitudes of prostates of various shapes are observed. Plate 4 shows a bilobed prostate which was removed from a patient 60 years of age, suffering from complete retention. Plate 5 illustrates a large median outgrowth or three-lobed prostate. The patient, 71 years of age, was suffering from chronic interstitial nephritis and cardiac hypertrophy. His blood pressure was 210, and the bladder distended to the umbilicus. After ten days of nursing and preparation, suprapubic prostatectomy was performed. The wound healed in three weeks and there has been absolute functional restoration. One lobe may be extravesical while the other is extra- and intravesical. Plate 6. A cross section of such a prostate through the intravesical portion would show the urethra raised high above the base of the bladder and surrounded by a horseshoe-shaped mass of prostatic tissue.

The disposition of the glands of the normal prostate is responsible for the irregularities of hypertrophy. These glands can be divided into various groups, the enlargement of any one of which will produce a different-shaped hypertrophy. If the subcervical group is enlarged, a bar at the neck results. Plate 7. This small bar of prostatic tissue produced

Fig. 3. Showing groove produced by constriction from the internal vesical sphincter.

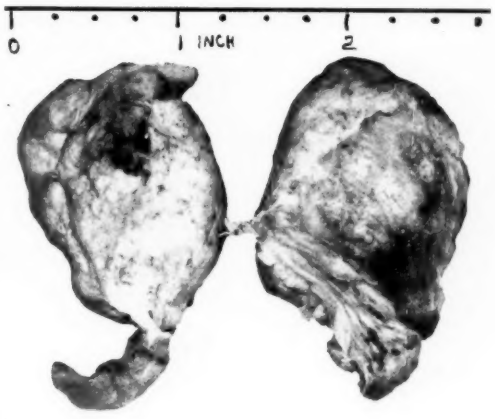

Fig. 4. Bilobed prostate.

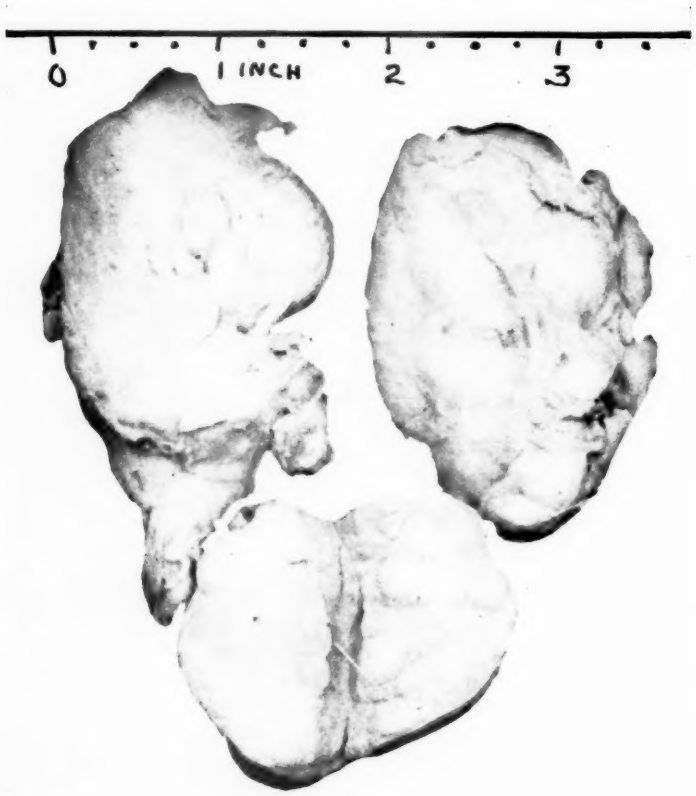

Fig. 5. Three-lobed prostate.

eight ounces of residual urine and the incontinence of overflow; if the prespermatic group, a median outgrowth. Plate 8 shows a typical median lobe hypertrophy which caused complete retention.

These median outgrowths are usually so firmly attached to one or other of the lateral lobes that, surgically, they may be regarded as an outgrowth from the lobe.

The arrangement of the musculature of the bladder determines the configuration of these so-called median lobes. Plate 9.

To illustrate, a small outgrowth pushes up through the floor of the bladder between the prominent bundles of longitudinal muscle fibers which run from the ureters to the internal vesical meatus. These muscles limit its lateral advancement and, enlarging in the line of the least resistance, namely, upwards and inwards, a most effectual obstruction to the vesical outlet is produced.

Hypertrophy commences in the central group of glands. Pressure exerted by these enlarging portions upon the external surface of the prostate is said to produce a pseudo capsule composed of prostatic tissue which has been compressed.

With these anatomical relations in mind, I shall proceed to a description of suprapubic prostatectomy which, in my experience, has most closely approximated the ideal.

We will presume that all operative preliminaries are completed, even to the filling of the bladder, the arrangement of the sterile

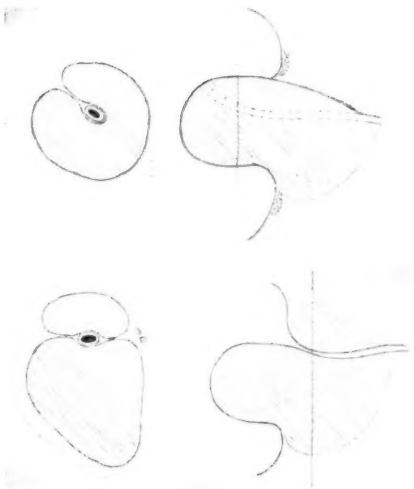

Fig. 6. Cross section, one lobe extravesical, the other intra- and extravesical. Urethra elevated and surrounded by one lobe.

towels, etc., and the surgeon is ready to operate, before the anæsthetic is commenced. At the moment of relaxation the abdominal incision is made and the bladder exposed. Plate 10. The bladder is opened by an incision large enough to admit two or three fingers, high up on the fundus and close to the peritoneal attachment. This may seem to be a trivial matter, yet it has a direct bearing upon the time required for the healing of the suprapubic sinus. Plate 11. If the bladder is opened low down near the neck to avoid the possibility of injuring the peritoneum or otherwise, when the patient's convalescence permits him to assume an upright position. Plate 12. The bladder opening of the sinus is in a relative dependent portion of the bladder. Constant escape of urine is thus facilitated and prolonged persistence

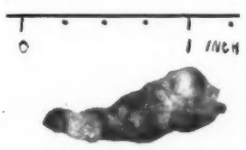

Fig. 7. Prostatic bar.

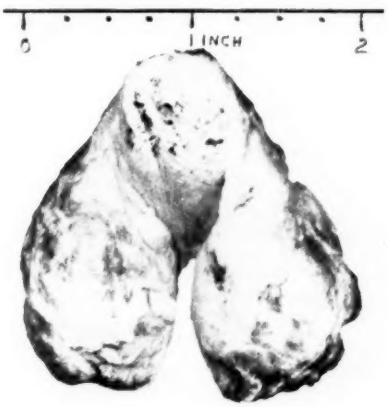

Fig. 8. Typical median lobe hypertrophy.

of a fistula may result. Plate 13. This does not occur if the incision is made high up so that the internal opening of the postoperative sinus is above the level of normal urinary outflow.

The next step of the operation, namely, enucleation of the prostate, is necessarily the most important one.

We have been taught to remove the prostate from its sheath through an opening into the bladder mucous membrane over its most prominent lobe. Such an enucleation is, therefore, started intravesically. The finger dissects forward, meets with the fibers of the internal sphincter and external longitudinal muscles, where they encircle the prostate at the line of demarcation between intra- and extravesical portions, and the tendency is for the finger to pass outside the muscular covering of the prostate and thus remove the prostate as a whole rather than the lobes separately. This so-called removal en masse is characteristic of Freyer's operation, in which no effort is made to save the prostatic urethra but a removal of the prostate with its encircling muscular fibers is aimed at. Plate 14 illustrates such a removal. The patient was 65 years of age. Complete retention was present due to a ball valve formation of a median lobe. Removal of the whole prostate resulted in restoration of normal urinary function.

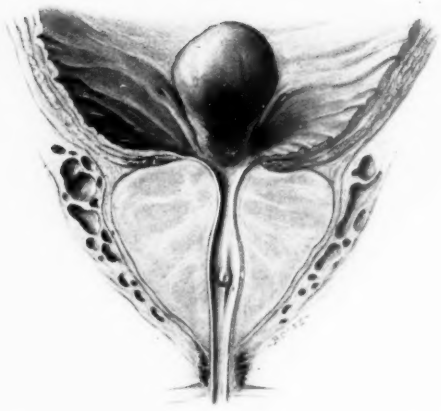

Fig. 9. Showing the ball and socket type of hypertrophy.

The method of enucleation which I prefer varies from this description in that enucleation is begun extravesically. It is recommended because it materially reduces the length of time of the operation, on account of the rapidity by which the prostate can be shelled out, as well as lessening the chance of damaging the ejaculatory ducts. Plate 15.

The procedure is to insert the finger into the internal meatus and break through the roof of the prostatic urethra. Access is at once given to the proper line of cleavage between the lobes, since at this point they lie in close apposition, being separated only by the capsule.

The enucleation is begun by pushing the finger upward and forward, freeing the apex of the lobe from its attachment to the urethra and triangular ligament. Plate 16. It is then swept around the surface, and the lobe (Plate 17) is hooked back into the bladder with its apex pointing upward, then a little separation from the bladder mucous membrane completes its removal. A similar procedure is repeated on the other side and the enucleation is complete. The moment the prostate has been delivered the anæsthetic is stopped.

With a little care there is no danger of injury to the rectum. An assistant steadies the prostate through the rectum during enucleation. The operator should not do so as it interferes with the immediate completion of the operation because of the necessity of resterilization of the hands and changing of gloves.

Having removed the prostate from the bladder, the subsequent steps of the operation are completed as follows: A drainage tube is inserted at the upper angle of the bladder wall and the lower angle sutured tightly up to the tube, for reasons which I have already mentioned in speaking of persistent fistulæ following prostatectomy. The abdominal wound is closed by a few figure-of-eight silkworm gut sutures, one loop approximating the fascia and the other loop the skin.

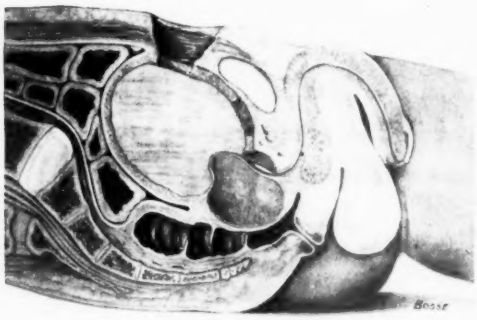

Fig. 10 The proper location of bladder incision.

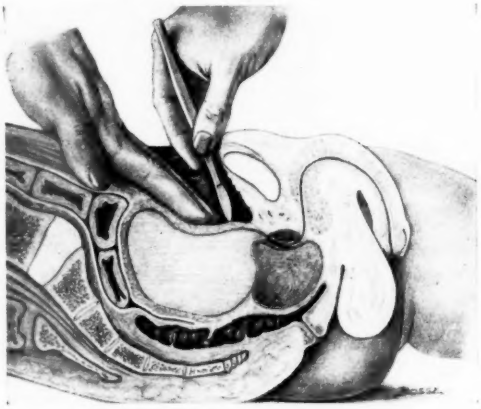

Fig. 11. Improper location of bladder incision.

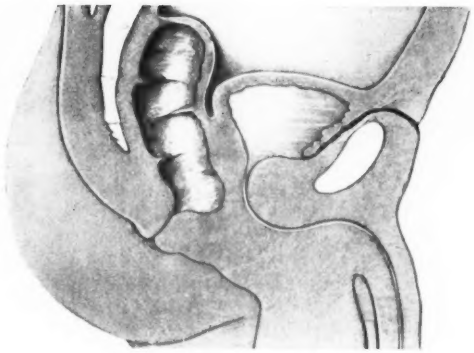

Fig. 12. Course of sinus after improper bladder incision.

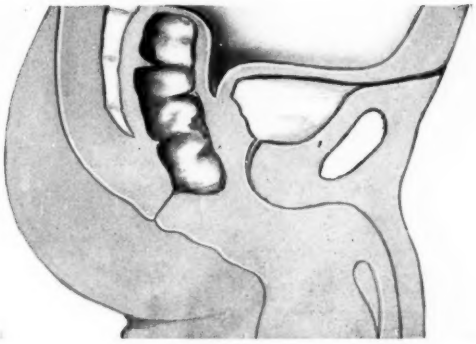

Fig. 13. Course of sinus after correct bladder incision.

Carried out in this way, a suprapubic prostatectomy can be accomplished in four or five minutes in most cases, and the patient need be subjected to complete anæsthesia but two or three.

The obstruction to urination having been thus removed, in what condition may we expect to find the prostatic urethra and the ejaculatory ducts? Plate 18 shows the course of the ducts through the prostate, and Plate 19 pictures the course the enucleating finger has pursued around the lobes and the cavity made by removal of the gland.

Therefore, a prostate without median outgrowth may be enucleated with practically no damage being done to the floor of the prostatic urethra. Plate 20. In cases where a median outgrowth exists, a part of the floor of the prostatic urethra, namely, that portion which is posterior to the colliculus, will come away with the prostate on account of its intimate attachment through the prostatic ducts.

Whether or not this portion of the urethra is removed is of no great moment. It is, however, desirable to preserve the integrity of the prostatic urethra anterior to the colliculus, as here are situated the openings of the ejaculatory ducts. Fortunately, nature aids us in so doing, as this part of the urethra

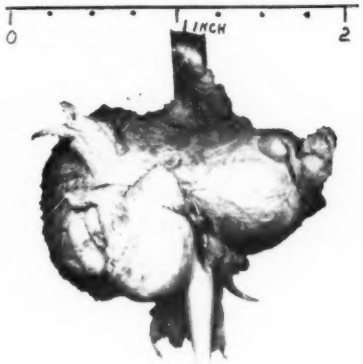

Fig. 14.

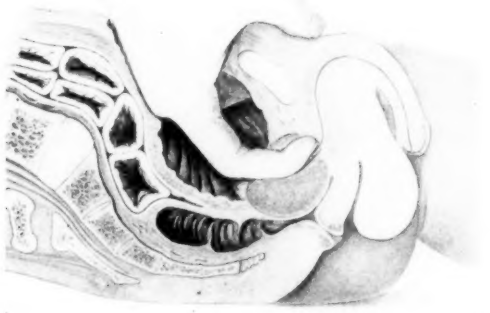

Fig. 15. Position of finger at commencement of intra-urethral suprapubic prostatectomy.

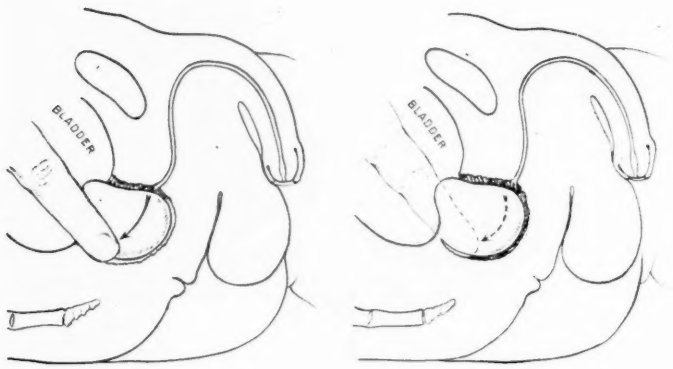

Fig. 16.

is not intimately attached to the prostate and, therefore, remains. Plate 21 shows prostatic urethra posterior to colliculus removed with prostate.

The fascia of Denonvilliers may be the reason for upward growth of hypertrophied prostates, and low insertion of the ducts, which also increases their protection from injury.

It may be argued that it is a matter of minor significance with the majority of prostatiques whether sterility following operation obtains. Nevertheless, there are many patients who will be most influenced by such a possibility in accepting or declining operation. If the patient can be given a reasonable assurance that his sexual powers will be no worse and possibly improved after prostatectomy, he more readily acquiesces to early operation.

Fig. 17.

The ideal moment to operate for prostatic obstruction is at the incipiency of symptoms, before the bladder muscle has become atrophied and the bladder a mass of diverticulæ and the kidneys undermined as a result of long continued back pressure. At such a time we find many of our patients sexually vigorous and not disposed to undergo operation for relief of what may be to them only urinary frequency, if there is a chance of becoming sexually incapacitated.

The following briefly reported cases are instances.

This point was brought up by each patient before operation. Plate 22 shows a large gland which was removed from a patient 80 years of age in order to relieve attacks of profuse hæmorrhage from the prostatic urethra. Bleeding followed the act of coitus, and would pour from the urethra irrespective of urination. After four attacks, in which it was necessary to tampon the urethra with an indwelling catheter, he submitted to operation.

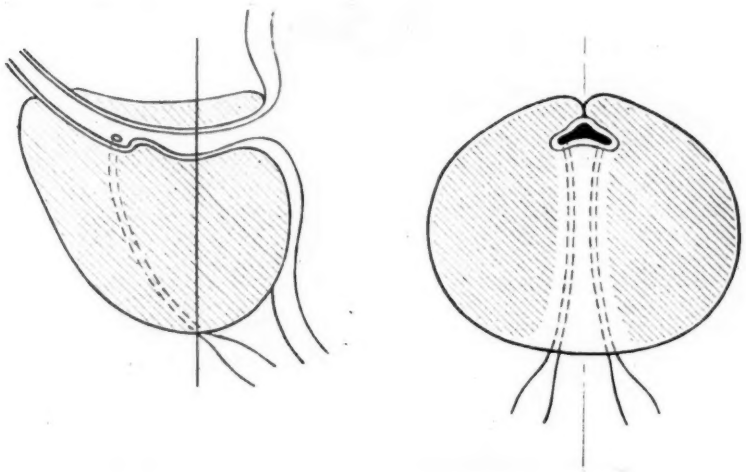

Fig. 18. Showing the course of the spermatic ducts through the prostate.

Prostatectomy was performed a year ago. Sexual capacity still remains vigorous. Plate 23 represents the prostate which was removed from a patient who had been on catheter life for three years. He was 58 years old at time of operation and had been unable to perform coitus during his catheter life. Two weeks following prostatectomy the wound had healed and he was voiding normally. Five weeks after operation he accomplished successful coitus.

Plate 24. The symptoms produced by this prostate were urgency and frequency, with five ounces residual urine. The patient was 65 years of age. Its removal resulted in normal urinary power, with ability to cohabit.

A final anatomical point in favor of suprapubic prostatectomy stands out so prominently that it practically outweighs all others, namely, that all operative work is carried on behind the triangular ligament. The compressor urethræ, which in prostatic hypertrophy alone guards the urinary outlet, is left undisturbed, therefore, the possibility of postoperative urinary incontinence is eliminated.

So much for the anatomical advantages of intra-urethral suprapubic prostatectomy. I trust I have shown that it is possible to combine the requirements of ideal prostatectomy in this operation, namely, relief of obstruction

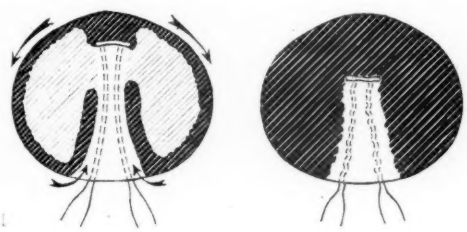

Fig. 19. Course of the enucleating finger and the cavity made by removal of the prostate.

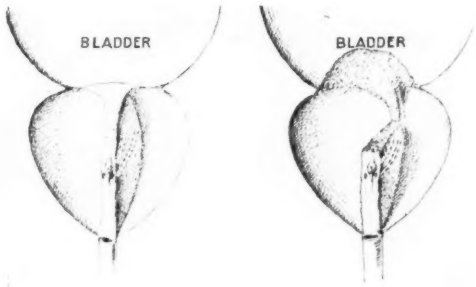

Fig. 20. Floor of prostatic urethra intact after prostatectomy. Urethra posterior to the colliculus removed. Ducts uninjured.

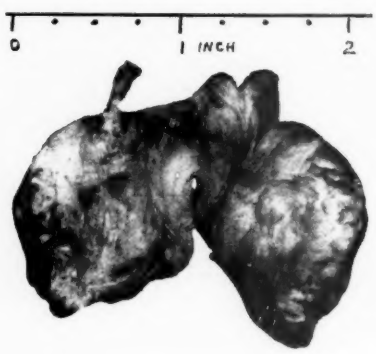

Fig. 21. Urethra posterior to the colliculus removed with prostate. (The border of the gland nearest the scale is the inferior.)

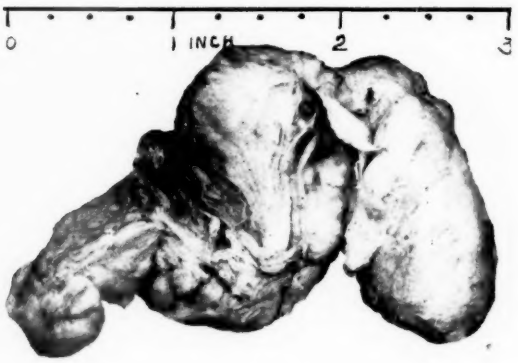

Fig. 23.

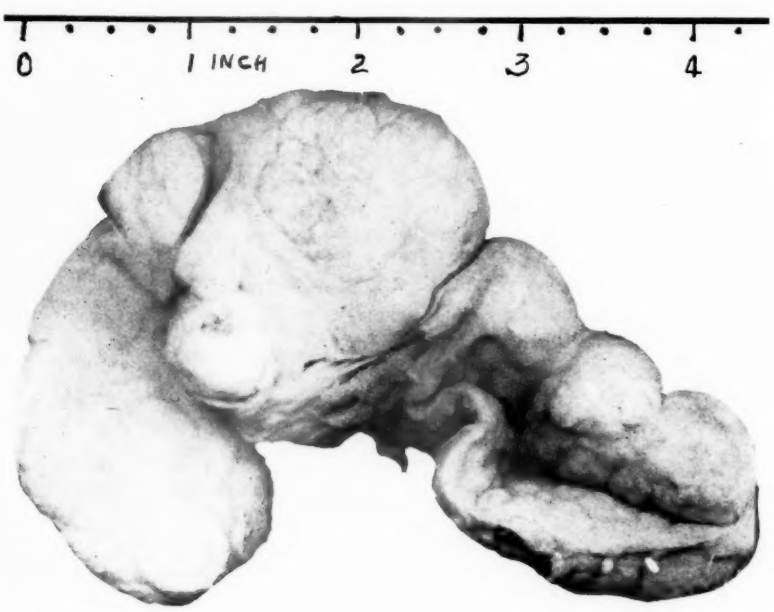

Fig. 22.

to urination, re-establishing urinary control and probably conserving the integrity of the ejaculatory ducts.

The operation just described is not only applicable to prostates in which the hypertrophy is of the glandular type. It has been the most efficient means of removing the small, hard, fibrous prostate whose growth is practically extravesical. Plate 25. A small, hard, fibrous prostate is here shown. The prostatic urethra was greatly contracted and before operation it was only possible to pass a No. 12 catheter. There was eight ounces of foul residual urine. By splitting the roof of the prostatic urethra it was removed easily with resultant cure.

Plate 26. Another form of fibrous prostate, the collar or band constricting the internal meatus. This was removed from a patient 75 years of age who had had no voluntary urination for one year prior to operation. Normal, voluntary urination was established four weeks after operation.

The difficulty in enucleating such a prostate through an intravesical incision in the bladder mucous membrane is enhanced because the internal vesical sphincter still lies in apposition to the base of the prostate. The finger has, therefore, to bore through the bladder mucous membrane and the sphincter muscle, and seek a line of cleavage which in this form of hypertrophy is largely obliterated, on account of the pathological adherence of these structures.

Intra-urethral enucleation overcomes this

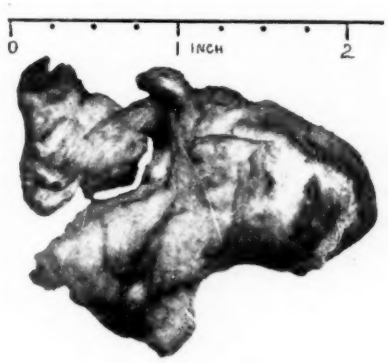

Fig. 24.

difficulty since, if a plane of cleavage exists, it is readily found. It must be admitted that in some of these cases the prostate comes away in ragged shape with considerable tearing, but even then there is no likelihood of injury to the compressor urethra muscle which is the bete noir of removing such a prostate from below.

A strong argument for suprapubic prostatectomy lies in the assurance that the gland has been completely removed and that no tabs or small outgrowths have been overlooked.

Plate 27. A graphic illustration is presented by this specimen. It represents an overlooked nodule of prostatic tissue which has been removed by suprapubic prostatectomy some years after a perineal operation which had been performed by a very able colleague. The original operation had given no relief. Cystoscopy demonstrated this small nodule

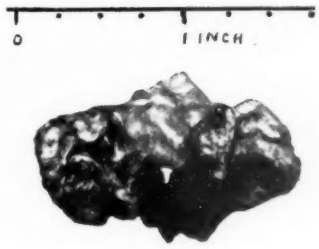

Fig. 25.

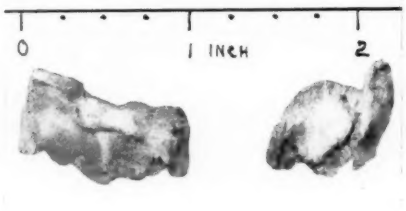

Fig. 26.

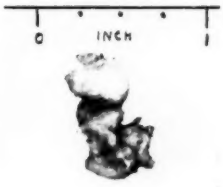

Fig. 27.

Fig. 25. Small fibrous prostate. (The border of the gland nearest the scale is the inferior.)
Fig. 26. The collar or band type of fibrous prostate.
Fig. 27. Unremoved nodule causing retention after perineal prostatectomy.

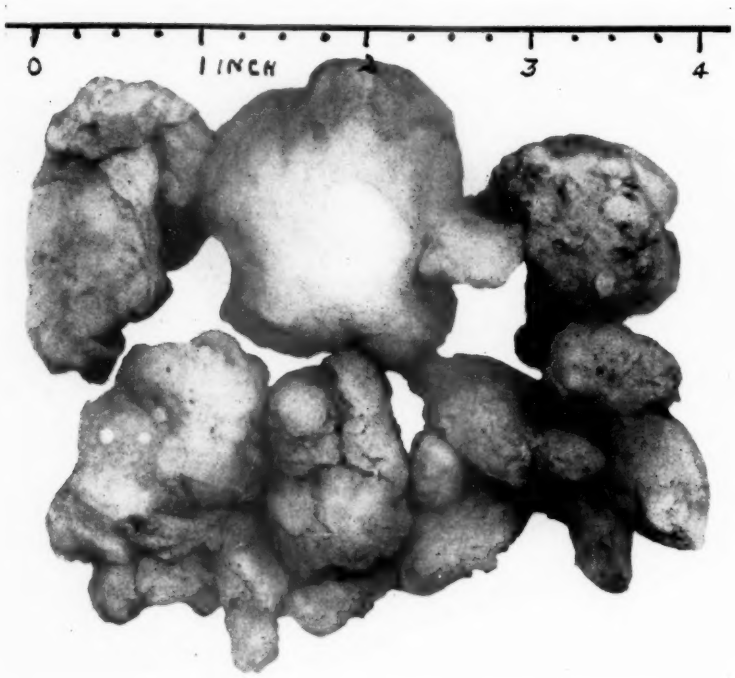

Fig. 28. Showing the lobular removal common to perineal prostatectomy.

obstructing the internal meatus. A cure followed its suprapubic removal. The possibility of overlooking such a nodule when operating through the perineum may be due to the fact that, even though the prostate be steadied by some form of tractor, it is constantly slipping away from the finger, and lines of cleavage between the lobules are entered instead of keeping outside the lobe. Such a condition tends towards removing the prostate in pieces.

Plate 28 illustrates the lobular removal so common to perineal prostatectomy. Plate 29. Another perineal removal, showing the same. Plate 30, a similar illustration, When working from above downwards, the prostate is firmly held at three points, namely, the triangular ligament, the pubic arch, and by the assistant's fingers in the rectum, and, therefore, it is comparatively certain to keep within the proper plane of cleavage and thus complete removal is insured. Plate 21 shows the completeness of removal by suprapubic intra-urethral enucleation.

Relative to postoperative complications, I think the burden of evidence favors the suprapubic operation. The occurrence of many of these following either operation, however, may depend upon the degree of the surgeon's skill.

Rectovesical or urethral fistulæ, for instance, are usually found only among the cases of the surgeon's early experience with the operation. Persistent suprapubic fistula will not occur if the bladder is opened and the drainage tube placed as I have indicated.

I have had to operate upon two patients for closure of persistent suprapubic fistulæ following prostatectomy. One followed an operation of my own, and the other that of another surgeon. In each instance the internal opening of the sinus was close to the bladder neck and rather difficult to approach. Both were treated similarly, by excision of

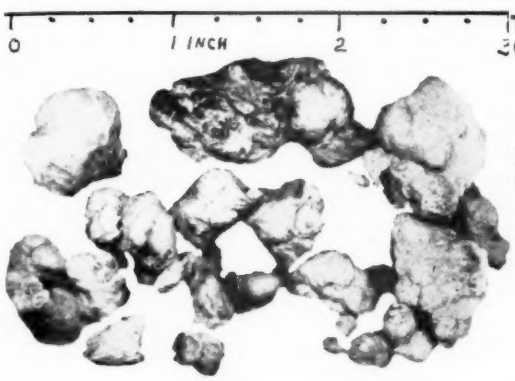

Fig. 29.

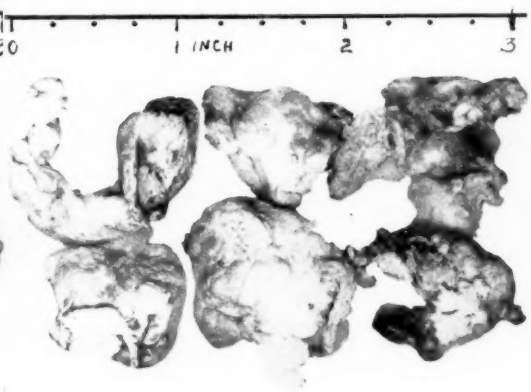

Fig. 30.

the tract, freshening the bladder edges, and tightly suturing the bladder. Drainage was carried on by indwelling catheters and the cases healed quickly. These cases impressed me with the necessity of a high bladder incision and accurate closure, subsequently, of the lower angle.

One frequent complication of my perineal prostatectomies, and this has also been the experience of others, is postoperative epididymitis. It is of unusual occurrence following suprapubic operation and an alarming complication in but one of my suprapubic cases. This patient was fifty years of age, with bladder symptoms extending over a period of two years. Cystoscopic examination showed the presence of calculi in his bladder, with a median outgrowth of the prostate obstructing the internal meatus. Plate 32. By suprapubic operation the calculi and median lobe, which are seen on the screen, were removed. A foul condition of the bladder was present, and following operation an infection of the abdominal wound took place as well as a

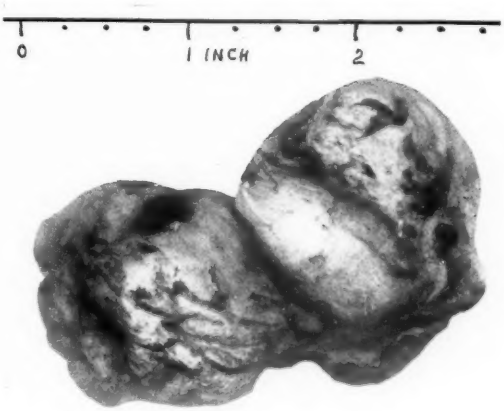

Fig. 31. Illustrating the completeness of suprapubic intraurethral enucleation of the prostate.

Fig. 32. Median lobe and vesical calculi.

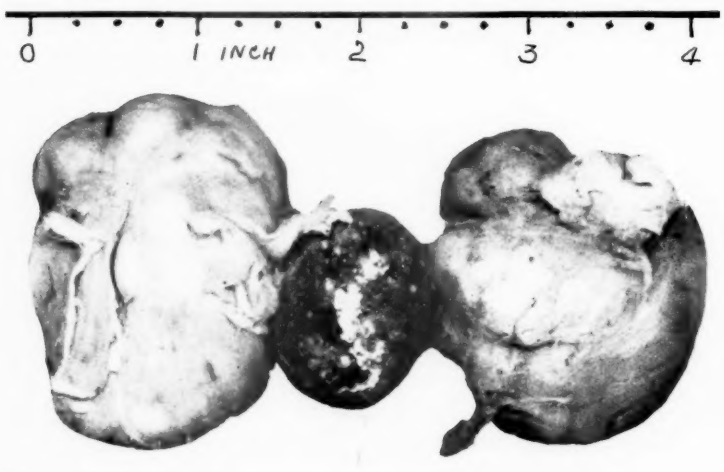

Fig. 33. Prostate and calculus removed suprapubically after unsuccessful Bottini operation.

left-sided epididymitis, which went on to suppuration. The man was acutely ill, but after a tedious convalescence made a perfect recovery with the exception of the damaged testicle. This has not, however, impaired his virility, as he has demonstrated upon repeated occasions.

Permanent incontinence of urine has resulted in but one case of suprapubic prostatectomy. Before coming under my care a modified Bottini operation, through an external urethrotomy incision, had been performed upon the patient. When examined, he was suffering from painful, frequent attempts to urinate with bloody urine. A searcher demonstrated the presence of a calculus, and a catheter drew a large amount of residual urine. By suprapubic cystotomy, a good-sized calculus and prostate were removed. Plate 33. The enucleation was rather difficult on account of the scar tissue in the prostate. After healing of the wound incontinence developed. It occurred only when the patient was in an upright position. He was able to urinate without difficulty and to interrupt the stream at will, and to completely empty the bladder. My belief is that the scar of the cautery operation interfered with the function of the compressor urethræ muscle, and was more responsible for the incontinence than the prostatectomy.

Serious hæmorrhage following suprapubic intra-urethral enucleation is rarely observed. No doubt, since the enucleation is carried on inside the muscular covering of the prostate, the large veins of the prostatic plexus are not liable to be opened, these muscular fibers being more firmly attached to the sheath than the prostate.

In contrasting perineal and suprapubic prostatectomy there seems to me to be as decided a choice between the accepted method of performing perineal as with suprapubic prostatectomy. The anatomical dissection of the perineum with removal of the prostate through lateral capsular incision, as perfected by Dr. Young, far outshines median perineal prostatectomy. The one is a brilliant surgical performance where effort is made to leave the compressor urethræ muscle and the ejaculatory ducts physiologically intact. The other is a blind removal which has little to recommend it except as a quick means of draining the bladder, since there is no guarantee that incontinence of urine may not be the end result. The first is often referred to as an operation of sight. The drawback is that such sight does not extend into the bladder.

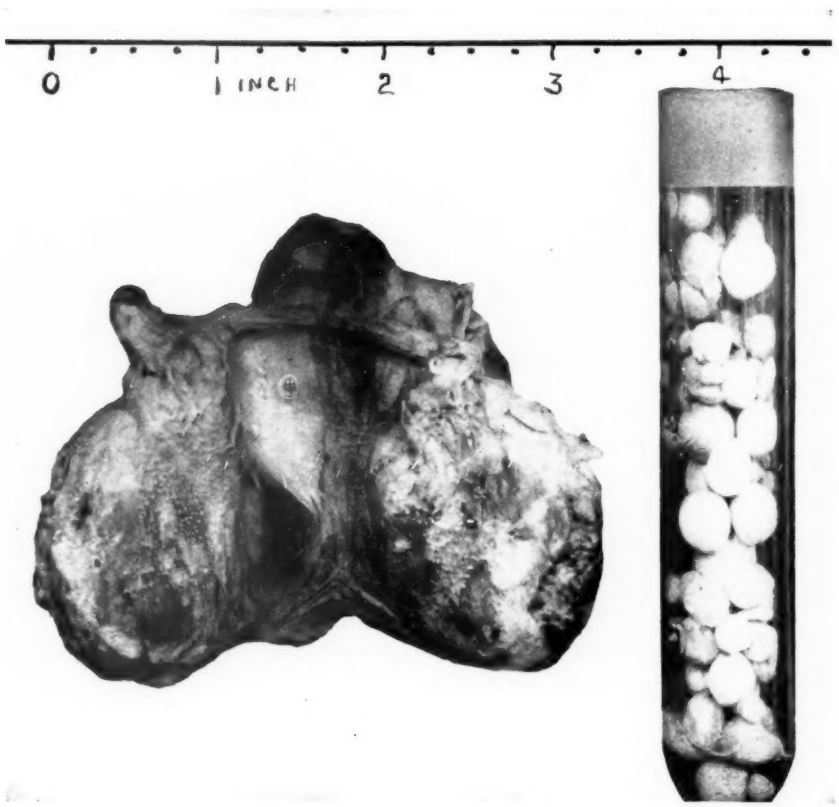

Fig. 34. Showing false passage in anterior portion of prostatic urethra making catheterization impossible. Emergency prostatectomy.

The dangers of prostatectomy are those of any major surgical operation. Many of these, fortunately, we are able to reduce to a minimum before operation. This is the keynote of the situation. The patient should be trained for this event in his race for life. He should not be rushed into operation without having had his kidneys prepared for the strain. The importance of preliminary nursing cannot be overestimated.

Emergency operation for prostatectomy is of rare necessity, but if such an emergency should arise suprapubic prostatectomy is then the operation of election, if only on account of the rapidity with which it can be performed. If the patient succumbs it is usually from renal insufficiency or from shock, and predisposition to these is increased by the length of time required for the patient to be under the anæsthetic. My experience has been that if it is necessary to open the bladder for drainage, the few moments spent in enucleating a prostate by the method I have described has not added to the chances of death. Plate 34 cites an instance, this specimen was removed from a patient 76 years of age. I was called to see him late at night and found him in an alarming condition. The pulse was weak and rapid, and the lungs were full of fine râles. The bladder was distended above the umbilicus; he had not urinated for eighteen hours. Repeated

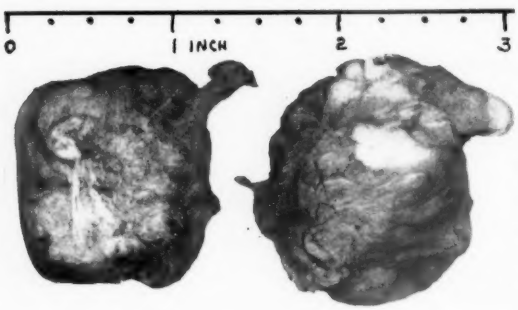

Fig. 35. Emergency prostatectomy.

unsuccessful attempts had been made to pass a catheter and every variety had been tried. I also failed and decided to open the bladder at once, if only for drainage. A few whiffs of ether produced primary anæsthesia and the bladder was opened. Multiple calculi were found present in the bladder, as well as a symmetrically enlarged prostate. The ether had acted as a stimulant and the patient's pulse had improved, so the prostate as well as the calculi was removed. The patient was under anæsthesia but seven minutes. The convalescence was uneventful.

Plate 35. Another case, from whom this prostate was taken, suffered from complete retention with hæmorrhagic cystitis. His condition was serious. Cystotomy was undertaken for drainage only, but the patient's condition became so satisfactory after the anæsthetic was started that the prostate was removed. The total time the anæsthesia was administered was four minutes.

The question of subjecting patients suffering from enlarged prostate to any form of general anæsthesia is a serious one. The indication unquestionably is for the minimum of anæsthesia, pointing directly towards rapid operation. To reiterate, the patient should be completely prepared for operation before any anæsthetic is started so that at the moment of relaxation the surgeon can commence his operation immediately. As soon as the enucleation of the prostate has been completed and the prostate removed, the anæsthetic should be stopped.

One cause of fatality following prostatectomy stands out prominently, namely, pulmonary embolism. This has occurred in my work both after perineal and suprapubic operation. I cannot believe that the means of approach to the gland has any very important bearing upon its causation. It has been stated that it is possibly more frequent after suprapubic prostatectomy, since the patient is confined to bed for a longer period, but this has not been my experience. In two instances where death was caused by pulmonary embolism, death followed in ten hours after a perineal prostatectomy, and in twenty-six hours after suprapubic. Another death from this cause followed perineal operation at the end of the fifth day. The factor which I do believe causative is severe vesical or rectal tenesmus, or anything which produces violent straining of the abdominal muscles, and in this way aspirating a clot into the general circulation. Therefore, it is imperative to provide perfect drainage for the bladder and to guard against accumulations of scybalous masses in the rectum.

Suprapubic is, on the whole, a simpler operation than perineal prostatectomy, and men all over the country attempt it where they would not a perineal. There will be a great many patients operated upon who are poor risks at best, and the combined mortality of the suprapubic operation will be larger than the perineal.

I believe that if prostatectomy is performed either from above or below by surgeons whose experience is equal with these two methods of operation, the rate of mortality will be the same; with the greater number of operative failures, however, on the perineal side.

When it is so proven that perineal prostatectomy has no mortality, it will become the operation of election. Surgically, it offers nothing which is not more easily and rapidly accomplished from above, a cure is less certain and it lacks giving the knowledge which an inspection of the bladder imparts.

THE CURE OF PROSTATIC OBSTRUCTION

By HUGH HAMPTON YOUNG, M. D., Baltimore, Maryland

I HAVE been asked to speak on the advantages of perineal prostatectomy. I dislike very much to assume the rôle of the partisan and have therefore decided merely to present the results of my own experiences, leaving you to judge for yourself.

My first operations upon the prostate were by the suprapubic route through which I have operated all told upon about forty-five cases with a mortality of about ten per cent. I next tried the perineal method of Alexander (perineal enucleation with suprapubic incision to push down the prostate). The Bottini operation was next employed by me in eighty-five cases with a mortality of about seven per cent, and unsatisfactory results in so large a percentage of cases that I again turned my attention to the perineal route and developed the operation of conservative perineal prostatectomy, the mortality from which has been about three per cent.

During recent years I have appreciated more and more that there existed a group of prostatic obstructions which could not be very satisfactorily treated by either perineal or suprapubic prostatectomy; cases of inflammatory median bar formation or contracture of the neck of the bladder, and during the past two years I have developed an entirely new procedure — the urethroscopic median bar excision by means of a special "punch" which I have now used upon about seventy cases with no deaths and with excellent results.

In a few instances there was present a small pedunculated median lobe which was removed with the "cystoscopic rongeur" in five cases preliminary to the punch operation. In six cases of cancer of the prostate a radical excision of the entire prostate and seminal vesicles has been carried out, so that now the sum total of our experience embraces about seven hundred cases, and with your permission I will deal briefly upon the results obtained by the method which now seems to me most satisfactory.

I have been asked by the editor to give a few details of the operative technique, so, at the risk of repeating too often, I will mention a few of the important steps of the so-called conservative perineal prostatectomy.

The inverted V-incision is used in order to give an operative space which corresponds to the interval between the ischio pubic rami. This incision extends only through the skin and subcutaneous fascia, and by blunt dissection on each side of the central tendon the space behind the transversus perinei muscles, and in front of the levator ani muscles, is opened up. It is only necessary to "poke in" your finger on each side and then to insert the bifid posterior retractor in order to thoroughly expose the perineum, and after division of the central tendon immediately behind the bulb to obtain at once a good exposure of the membranous urethra behind the triangular ligament and external sphincter. This is not a wide dissecting operation as has often been asserted, in fact the exposure of the membranous urethra, which is incised upon a sound to insert the prostatic tractor, is almost entirely by blunt dissection, merely the opening up of the natural lateral perineal spaces with the finger. The great advantage is, that, as soon as the rectum is pushed back, a fine exposure of the prostate is obtained and with the tractor the prostate can be drawn down often almost to the surface of the skin where one may carry out the enucleation of the lateral and median portions with all care and thoroughness as shown in figs. 1 and 2. The great advantage of this route is that the incision of the bulb and the resultant hæmorrhage, the injury to the important muscular and sphincteric structures of the triangular ligament are avoided, and a splendid view obtained so that the operator is free to carry out any procedure which he desires. If carcinoma is suspected an exploratory incision or excision of tissue may be carried out, and if maligancy is demonstrated and the case is apparently favorable, a radical operation can be done. That such radical operations may be successful is shown by the fact that I have now two cases alive

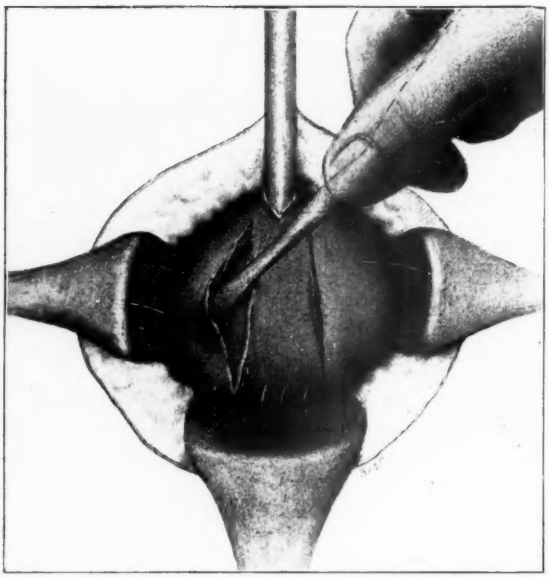

Fig. 1.

and apparently well after six years in one and three years in another case.

In enucleating the prostate I found it much more satisfactory to use bilateral incisions so as to preserve the floor of the urethra and the ejaculatory ducts. After enucleation of the lateral lobes the median lobe can be easily drawn down into either of the lateral cavities and enucleated. The bladder is so close to the perineum that the finger can then be inserted into it, and thorough exploration for remaining prostatic lobules, stone, the condition of the internal sphincter, etc., carried out. Not only is it possible to remove large vesical calculi, but even calculi from diverticula and from the ureter. (In two cases I have removed ureteral calculi which projected into the bladder, after removing the prostate through the perineum.)

Perhaps one of the greatest advantages is that after enucleation of the prostate there exist two lateral extravesical cavities which can easily be packed with gauze, thus completely stopping the hæmorrhage, cavities which rapidly collapse after removal of the gauze on the following day, and which do not form intravesical pouches of suppuration. Another great advantage is that the patient can be up in a wheel chair within two or three days, with splendid dependent drainage. The absence of any case of death from sepsis and the remarkable freedom from lung complications is shown in a series of 450 cases of conservative perineal prostatectomy; a study of which I have recently prepared for the Congress of Urology meeting in London this summer, and an abstract of which I shall now present:

Ages of patients. In 482 cases of benign hypertrophy and cancer of the prostate, which I have operated by the method of conservative perineal prostatectomy, 13 patients were over 80 years of age; 75 over 75 years of age; 171 over 70 years of age; one patient being 87 and the other 88 years old. The operation was never refused on account of the age of the patient, and in fact during the past two years there has been only one patient who was sent home unoperated, and this on account of an extremely bad heart, and because the patient was fairly comfortable with a catheter.

In order to arrive at the results obtained it seems desirable to take up the convalescence in the hospital and after returning home. The fistula closed in 18 cases during the first week after the operation, and in 56 per cent of the cases in less than 21 days. In only 14 per cent was the fistula present after the sixth week and in only 27 cases out of 450 did the fistula persist longer than the third month. It has been found unnecessary to use catheters or sounds in order to hasten the closure of the fistula.

As showing the benignity of the operation the length of stay in the hospital is instructive. One patient returned home with fistula closed and voiding naturally with good control on the sixth day after the operation. Eighteen patients (4 per cent) were discharged during the second week; 124 patients (28 per cent) left inside of 3 weeks, and 254 patients (56 per cent) left inside of 4 weeks and only 22 patients (4.9 per cent) remained over 2 months. It is indeed remarkable to see how

rapidly those old and, often, very infirm patients convalesce. They are almost always out of bed by the third day after operation and walking around during the first week. Among the 450 operative cases I have been able to find 331 patients who are still alive and in only 7 cases have I been unable to get word as to whether the patient is alive and his condition.

The time elapsed since operation is 7 years in 13 cases and in only 26 cases under 6 months. Among those 331 patients the majority have polyuria, particularly at night, but 72 patients state that they do not have to arise at night at all to urinate (22 per cent); 231 did not have to arise more than once or twice during the night (66 per cent). During the day all but 12 per cent retain their urine three hours or more.

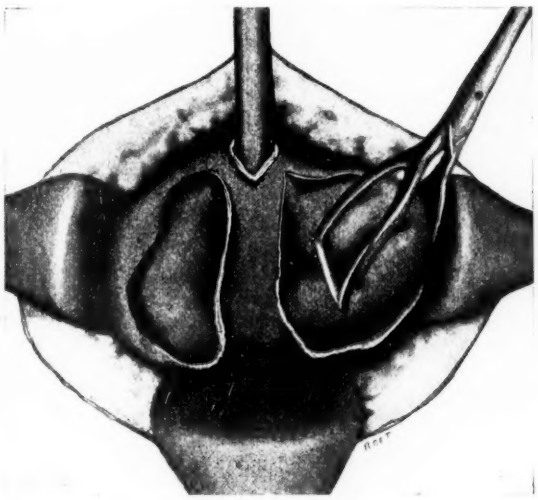

Fig. 2.

I have made careful inquiries as to the return of obstruction and use of catheters by the patients after leaving the hospital and I can find only four patients in whom there is present, or has been since operation, an almost complete retention of urine requiring catheterization several times daily. When we consider that in about 70 per cent of the cases a catheter was employed before operation, we see how thoroughly these statistics refute the idea of Thompson and Guyon that after a long standing catheter life one cannot expect a return of vesical tonicity and normal urination. These four cases which are given in full in my complete analysis were of the small sclerotic or inflammatory type of prostate, with internal sphincters difficult to dilate, and they demonstrate that this class of cases is, as was pointed out by Albarran several years ago, most unsuitable for prostatectomy, whether perineal or suprapubic. Other statistics and cases which I shall report further on show that they are best treated by means of a partial prostatectomy or median bar excision, preferably by means of a urethroscopic median bar excisor. There are eight cases in which there has been a partial return of obstruction. Examination of these cases shows that in none of them is the retention of urine complete; that in several cases the obstruction, now present, is due to the failure to remove the median portion of the prostate at operation and in two other cases because of recontracture of a small sclerotic prostate. In one case it is impossible to explain the presence of obstruction and 250 cc. residual urine, the operation having been extremely thorough and radical.

In eight cases the outflow of urine was not quite normal, the stream being rather small and the catheter showing a small amount of residual urine. The cystoscope in these cases showed a small median fold or lobule which was causing slight obstruction and it has been possible in these eight cases to remove this obstruction either with the urethroscopic punch or the cystoscopic rongeur, and these cases are now in excellent condition.

These two operative methods were also used in several other cases in which patients had been subjected to suprapubic prostatectomy by others, and in which the capsular fold or lobule was present as the cause of residual and imperfect micturition. These methods make it possible to perfect the result obtained either by perineal or suprapubic prostatectomy, where, in the contracture of the tissues after operation, slight obstruction is produced. With the exception of the four cases, as stated above, the operative results

have been well nigh perfect in all of the cases.

There are seven cases in which I have been unable to get any reply from the patient, his family, or his physician, or to ascertain whether they are alive. These seven patients were operated on from five to eight years ago and were all followed for at least one year after the operation and over three years in all but two cases. The results obtained were good in all but one case who reported one year after operation that he suffered from pain and frequent urination. Calculi had been present before operation and were probably present at last report.

A great deal has been written about the danger of incontinence of urine after perineal prostatectomy, and I have made special efforts to get accurate reports in regard to this condition. A careful study of these shows not a single case of complete incontinence — dribbling night and day. There are three cases in which there is partial incontinence during the day time. Two of these have been carefully examined and show dilated internal sphincters and posterior urethræ. In one of these cases the muscular structure of the external sphincter was injured in exposing the prostate, and this may be a causative factor. In the other two cases there is no record of injury of the external sphincter. The third case shows a small irregular pedunculated median lobe which lies within the internal sphincter and evidently prevents its complete closure. In two cases similar to the one just mentioned the removal with the cystoscopic rongeur or urethroscopic punch of small lobules at the vesical orifice completely cured slight incontinence which was present. It therefore seems evident that incontinence is often due to incomplete operation, the failure to remove some small lobule at the internal orifice or along the urethra, and that this in turn prevents closure of the sphincter and leads to slight incontinence, particularly on coughing or sneezing. The preservation of the external sphincter is of great importance, and the perineal operation should always be done through an exposure by blunt dissection behind the transversus perinei muscles and triangular ligament. The space on each side of the central tendon can easily be exposed by blunt dissection, and after division of the central tendon and recto-urethralis muscle traction behind the triangular ligament makes it possible to expose and enter the membranous urethra behind the external sphincter which is thus left uninjured. As soon as the perineal fistula heals urinary control generally returns at once or within a few weeks.

A careful study of results shows only two cases of recto-urethral fistula. In one of these gas and occasional feces pass into the urethra, in the other case the connection is very minute, no fecal matter escapes through it, and the patient says it gives him no inconvenience and refuses to have anything done to cure it.

If one is careful to divide the recto-urethralis muscle close to the membranous urethra, and to expose the anterior layer of Denonvilliers' fascia at the apex of the prostate, and to carefully follow this fascia in separating the rectum from the prostate, there is practically no danger of tearing the rectum. If torn the injury should be closed by layer sutures and suprapubic drainage supplied at once to divert the stream of urine. Sexual powers: Every effort has been made to determine the effect of operation upon erections and sexual powers. Only those patients operated upon more than a year or more ago were considered, 251 cases. Of these 133 stated their sexual powers were about normal before operation and of these 78, or 59 per cent, state that there has been a complete return of sexual powers since operation, whereas in 100 cases (75 per cent) erections have returned. An analysis of the 24 cases in which erections have not returned shows that 13 are now over 70 years of age, and of the 11 patients under 70 years of age, two have tabos dorsalis, and in 5 the ejaculatory ducts were unintentionally injured during operation. It seems to be abundantly shown that preservation of the floor of the urethra, ejaculatory ducts, and verumontanum have a distinct result in preserving the sexual powers, but perhaps more important is, that, by preserving this portion of the prostate intact, suppurative epididymitis is much less frequent. As epididymitis forms a very serious complication after prostatectomy it seems highly important that

every effort should be made not to tear across the ejaculatory ducts and thus give entrance to bacteria and ascending infection.

Our study reveals the fact that 79 patients have died since leaving the hospital. Of these, 37 patients were over 70 years of age before operation. The time elapsed between operation and date of death was 7 years in 2 cases; 6 years in 4; 5 years in 5; 4 years in 5; 3 years in 5; 2 years in 14; 18 months in 8; 12 months in 11; 6 months in 9, and under 6 months in 12 cases. At date of death one patient was aged 89; 5 between 80 and 84, and 37 between 70 and 80. The functional results obtained in these cases were good in all but two cases, who have been included in the poor results mentioned before. The cause of death was, disease of the heart, 13; kidneys, 12; lungs, 7; spinal cord, 2. Various diseases or no diagnosis in the rest of the cases.

Fatalities after operation. There were 17 deaths in 450 cases of benign perineal prostatectomy, or 3.77 per cent.

An analysis of these 17 cases shows that 3 of the patients were over 80 years of age, 2 between 75 and 79, 4 between 70 and 74, and 8 under 70 years of age. Time after operation at which death occurred is shown in the following table: On the day of operation one case, cause myocarditis, sudden heart failure. During the first week, 4; pulmonary edema, 1; cardiac and cerebral thrombosis, 1; cerebral hæmorrhage, 1; broncho-pneumonia, 1. During the second week, 4; pyonephrosis, 2; pulmonary thrombosis, 1; secondary hæmorrhage, 1. Three weeks, 1; pneumonia and uræmia. Fourth week, 3; uræmia, chronic nephritis, 2; pneumonia, patient aged 87. Fifth week, 1; pneumonia and uræmia, patient aged 81. Seventh week, 2; pneumonia, 1; hæmorrhage from throat, patient aged 88. Ninth week, 1; myocarditis, hypertrophy and thrombus of heart.

A further review of these cases shows only 5 in which death was strictly unavoidable. In the other 12 cases, with care and the present methods of examination and preliminary treatment, many should have been avoided. For example, 4 patients who had never been catheterized and had residual urine from 500 to 2,000 cc., were operated on without preparatory treatment (catheter, water, etc.), which would now always be instituted for two or three weeks in such cases. There have been many cases much more desperately ill on admission than any of the 17 chronicled above, and by careful preparatory treatment they have been tided over crises and finally brought to a condition sufficiently good for operation and convalescence.

In determining when a patient suffering with prostatic disease can be operated upon safely, perhaps the most important information is as to the functional capacity of the kidneys. For this purpose the phenolsulphonephthalein test, which has been promulgated in the genito-urinary department of the Johns Hopkins Hospital and experiments conducted reported by Drs. Rowntree and Geraghty, has proved of very great value.

After an intramuscular injection of 1 cc. of fluid containing 6 mg. the drug appears in the urine within 5 to 8 minutes in normal cases and can be detected by its red color. Within 2 hours about 75 per cent of the drug should be secreted and the amount can be accurately determined by the Dubosq colorimeter or the Helig hemoglobinometer. The drug is entirely eliminated through the kidneys, and when these are impaired the appearance time is much lengthened and the total output per cent for two hours is diminished. In severe cases of nephritis only a trace of the drug is eliminated, so that we have a very accurate and sensitive test. In all patients where this functional test shows marked renal impairment, preliminary treatment should be given, until the kidneys have markedly improved, or a condition of stability reached, after which operation may usually be undertaken without much danger. In some cases it has been the only method by which renal impairment has been shown and confirmed by autopsy. Details are given in full in the body of the paper.

By means of frequent or continuous catheterization and water in large amounts it is possible to bring most patients with even markedly impaired kidneys into condition sufficiently good for operation. The use of large amounts of water by mouth, by rectum, and subcutaneously after operation, and of

urotropin are of extreme importance. By this forced hydrotherapy and simplified after treatment, with patient out of bed and out of doors as soon as possible, even the most desperate patients can usually, after preliminary treatment, be carried successfully through operation. As evidence of this fact, during a period of two years and eight months there were 128 cases subjected to the operation of conservative perineal prostatectomy without a single death, of patients leaving the hospital improved or well. Of these patients two were over 80 and 43 over 70 years of age and many in very serious condition before operation, requiring prolonged preliminary treatment. These cases show that the operation itself is practically free from danger and that, if great care is exercised, the deaths can be confined to those unavoidable accidents and conditions which are likely to arise in very aged men whose life's run is almost completed and in whom very little is necessary to carry them into the great beyond.

Cancer of the prostate also deserves consideration, as recent statistics have shown in my clinic that one case in five of prostatic enlargement and obstruction in old men is due to cancer, in most all cases of which the diagnosis should be made before operation.

In my extended report the results of 42 cases of cancer of the prostate are detailed. Among these cases are six radical excisions of prostate, seminal vesicles, and neck of bladder (followed by anastamosis of bladder to membranous urethra), in which there are now two patients alive and apparently well; one six years after operation and the second two years after operation. One of these cases at least shows conclusively that even when the seminal vesicles are partly involved a radical operation can give an excellent curative result, and with early diagnosis, which should generally be possible, a large percentage of cures should be obtained.

Two patients were subjected to a partial radical operation with one excellent result; 34 patients were subjected to conservative enucleating perineal prostatectomy, the lateral and median portions of the prostate being generally removed without injury to the mucous membrane. Among these cases there were two deaths occurring over a month after the operation from carcinosis and uremia. Among the 32 patients who left the hospital improved there were ten in whom there was no return of obstruction up to the death of the patient from 1 to 3½ years after the operation, 13 who are still alive with excellent functional results, and no obstruction. In three cases there has been complete return of obstruction and in six partial return of obstruction.

The remarkable fact has been demonstrated that the functional results obtained in these cases of cancer are generally as good as in cases of benign hypertrophy.

Partial prostatectomies. In connection with the cases of perineal prostatectomy for benign and malignant enlargement, it seems advisable to report results which have been obtained by partial prostatectomy of the median portion of the prostate in cases in which it was not thought necessary to attack the lateral lobes. These cases have, as a rule, presented merely a median prostatic bar or rounded lobule with a moderate amount of residual urine, and generally were the result of a chronic prostatitis, rather than hypertrophy, of the median portion of the prostate. The method employed was excision of the median bar generally in three or four pieces, with the "urethroscopic median bar excisor" or "punch." In almost all cases the operation was done under cocaine, and after the blood had been evacuated from the bladder a two-way rubber catheter was inserted upon a stylet, and continuous irrigation kept up for 24 to 48 hours when the catheters were removed. In 20 cases in which this simple operation was used, 5 of the patients were under 50 years of age, and only 2 over 70. The residual urine varied from 30 to 100 cc. in most cases, but in 5 cases it was over 100 cc., in one case being 460 cc. In most cases symptoms of obstruction have been present for many years.

Results obtained in these cases have been excellent. Fourteen cases are absolutely cured, and the other six cases are almost completely relieved, not only of obstruction to urination but also of pain which was present in many cases. In five cases of vesical calcu-

lus associated with median bar formation, the punch operation was used after litholapaxy with splendid results. The punch operation was also used along with the cystoscopic rongeur in two cases in which small pedunculated median lobes were present. The same methods were employed in four cases of perineal prostatectomy in which the obstruction had not been completely removed, and also after two cases of suprapubic prostatectomy with excellent results in all of these cases.

The punch operation is much more radical than the Bottini and in cases where only a small median obstruction is present with no lateral enlargements this operation, which can be done under cocaine with practically no danger, seems to be the method of choice.

PERINEO–URETHRAL PROSTATECTOMY

By WILLIAM T. BELFIELD, M. D., Chicago, Illinois

THE adenomatous prostate has been enucleated through each of its three surfaces—vesical, urethral and rectal—by the suprapubic, perineo-urethral, and perineal operations respectively. The comparative merits and demerits of these may be briefly mentioned.

Certain disasters, inseparable from senility, are common to all. Peculiar to the incision for exposing the rectal surface of the prostate, the perineal operation, are the evils resulting from extensive damage to the perineal muscles, urethra, and rectum; of which permanent incontinence of urine, perineal and rectal fistulæ, and cicatricial contraction of the urinary outlet, are the most frequent and lamentable. The possible loss of erectile power, impotence, through damage to the perineal muscles, or verumontanum; and the probable occlusion of the ejaculatory ducts, causing sterility but not impotence, are minor objections which do not weigh heavily against the operation with these senile patients as a class. There are, however, exceptional subjects who, while indifferent to sterility, prize their potence above urinary comfort. (The delusion that conservation of the ejaculatory ducts preserves sexual potence, is curiously prevalent.)

Peculiar to suprapubic prostatectomy is imperfect drainage of the pockets from which the adenomatous masses have been enucleated, and of the prevesical space. Hence septic phlebitis, pneumonia, and embolism are somewhat more frequent, in spite of suprapubic drainage by ingenious mechanical devices, or even by gravity, the patient being placed on his face in the distressing prone position. The brevity of anæsthesia (especially if the operation be made in two stages, the first with a local anæsthetic), and the slight damage to the prostatic urethra, reduce shock and danger of uræmia; so that the actual mortality in experienced hands of suprapubic, but slightly exceeds that of perineal prostatectomy. The detection of sacculated calculi, the avoidance of urinary incontinence, of perineal and rectal fistulæ, are additional merits which have contributed to the conversion of many surgeons from the perineal to the suprapubic operation.

Perineo-urethral prostatectomy seems to possess the chief merits, and to lack the chief demerits, of the perineal operation. The median perineal incision, knife edge upward, opens the urethra at the apex of the prostate, behind the external sphincter (membranous urethra) and in front of the vesical sphincter. Even if the external sphincter should be partly divided, the cut is linear, and the surrounding tissues are not seriously damaged; thus the chances of permanent incontinence and of fistulæ are minimized. The absence of dissection, sharp or blunt, of the perineum reduces the percentage of obstructive cicatricial contraction, and of fistulæ; the rectum is not injured. The mucous membrane of the prostatic urethra

is incised cleanly over the enlarged lobe or lobes, sufficiently to permit the lobe to be raised from its bed by the finger. The prostatic capsule and adjacent venous plexus are not wounded. The vesical sphincter is thoroughly stretched and even incised if distinctly fibroid. (The frequent combination of a fibroid vesical sphincter with the enlarged prostate is sometimes forgotten; yet instances are recorded in which total suprapubic prostatectomy has failed to restore urination until the sphincter has been dilated or incised at a subsequent operation. Doubtless the incomplete evacuation of the bladder following prostatectomy is sometimes due to neglect to remedy this condition of the sphincter.)

My personal experience in prostatic surgery, now including over four hundred cases, began with a crude performance of this median operation in 1885. Finding access to the prostatic tumors sometimes unsatisfactory by this route, I employed the following year the suprapubic incision. To secure better drainage I then combined the suprapubic with the median perineal incision, using the latter for enucleation as well as drainage, and draining the prevesical space into the bladder.

In the early 90's Goodfellow showed that the exaggerated lithotomy position, so increased the accessibility of the prostate through the median incision that in most cases the tumors could be removed completely by this route. For twelve years past this has been in my hands the operation of choice; when I have failed to enucleate, or to extract sacculated calculi without undue violence, I have added the suprapubic incision, closing it at the end of the operation, and depending upon the perineal opening for drainage. In my experience this median incision seldom fails to give command of the prostate, but gives less security in exploring the bladder, which should be searched in advance with the cystoscope when possible. The objection that the enucleation is done without visual control is academic rather than practical, and applies largely to the actual enucleation after other incisions also.

To summarize: the last word as to prostatectomy has not been, and cannot yet be said; the evolution of this most important surgical achievement, virtually begun in 1885, is not yet complete. My impression is that the removal of the prostate through its sheath, commonly called perineal prostatectomy, should be abandoned by the average operator, as it has been largely abandoned even by the French school, who a decade ago revived and improved Dittel's operation of 1890. Of the two standard procedures, median perineo-urethral prostatectomy seems the operation of choice. Under exceptional conditions, such as the presence of large vesical calculi, a suprapubic incision may be required. In this event I am inclined to drain the bladder through a perineal "button-hole," which adds but little to the operation, but subtracts much from the danger of sepsis.

And finally, prostatectomy must be ranked as to mortality with the major operations, not because of its severity, but because of the subject's senility. It is to the average man of 70 like a nephrectomy to a man half that age. The best results reported, those of Young and of Freyer, average about four per cent mortality. Probably most surgeons must acknowledge nearly twice that proportion of fatality, if all deaths within a month after operation be included.

RESULTS FOLLOWING PERINEAL PROSTATECTOMY[1]

Based on Fourteen Years' Experience with this Method

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THIS paper is not intended as a plea for any special method of performing perineal prostatectomy, nor is it intended to set forth herein any detailed statistical account of the results of this operation. It is rather my object to review the subject in a broad way, giving special attention to a few important lessons which have been learned by myself during the last fourteen years.

In many respects we have passed the experimental stage. Experience has established certain well founded conclusions; many suggestions and plans have been tested and justly abandoned. With these we need not concern ourselves.

It has been demonstrated beyond question that radical removal of an obstructing prostate is the only satisfactory method of its treatment when the case has reached a period demanding active relief. This does not mean that every case of prostatic obstruction should be operated upon as soon as it can be recognized, or as soon as symptoms are manifest. But it does mean that properly performed, radical removal of the obstruction is the only means of affording permanent relief. Experience has also taught us that topical treatment by means of the catheter is never more than palliative, and that it is actually more dangerous than a properly performed radical operation.

To-day we are agreed that prostatectomy is the proper treatment for prostatic obstruction. There is still a difference of opinion as to whether it should be done by the perineal or by the suprapubic route. The combined method, that is the combined (suprapubic and perineal) methods, have been abandoned.

Perineal prostatectomy should be the method of choice when it can be satisfactorily employed, and by surgeons who can satisfactorily accomplish it. Anatomically, the perineal method is the logical one. From a clinical point of view it is preferable to the suprapubic method, because the immediate convalescence is more comfortable and much shorter and because the final healing of the wound is much more quickly brought about. Perineal prostatectomy has proven itself to be about twice as safe an operation as the suprapubic. This statement is not based on the statistics of any one, or of a few surgeons, but it is based on the work of a large number and variety of operators, so that it shows very fairly the average as to class of patients and as to skill of operators. As an example, one operator at one time was a firm believer in and an advocate of suprapubic prostatectomy. His results showed a mortality of twenty-five per cent. He became a convert to perineal prostatectomy and has been able to report large series of cases without a death. This is not like comparing the skill of one operator with that of another, but it is a very apt comparison of the two methods of operating in the hands of one man, with the same degree of skill and ability and personality. On the other hand, there has been a great improvement in the technique of suprapubic prostatectomy, as shown by a lowering of the operation risk, and to-day it has many advocates among whom are men of the highest ability and surgical attainment. There are also many who take the ground that both methods have an equal place; that certain cases are better treated by the suprapubic route, while they concede that the perineal route is the one of preference, all things being equal. For myself, I feel that the perineal method is certainly the one of choice; its comparative safety demands this view. I feel that it offers no disadvantage to the patient as compared with the suprapubic, and many advantages over it. In saying this, I refer to the immediate and to the remote postoperative recovery and to the ultimate

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results. In one case I failed in completely reaching and removing the prostate through the perineum. This case I shall speak of in detail later on. Perineal prostatectomy is undoubtedly a more difficult operation to perform than is the suprapubic, especially in certain cases. Undoubtedly this is a reason why some surgeons who have started as advocates of the former procedure have changed their opinion and have become advocates of the latter.

If a perineal prostatectomy be properly performed, it should give a perfect ultimate result. To perform perineal prostatectomy satisfactorily requires that it should be done with a full knowledge of and with a strict regard to the important anatomy of the perineum — and, of course, the anatomy of the perineum is a very complex one. The operator must be able to rely on his sense of touch, as well as on the sense of sight. Of course this is true in either method of operating. Successful perineal prostatectomy will depend upon a complete removal of the obstructing gland on the one hand, and on the other hand upon a satisfactory preservation and conservation of various important anatomical structures.

If these two objects be attained there will be complete relief of all the symptoms of obstruction, and there will ensue complete restoration of the normal bladder function. In other words, the patient will be able to hold his urine, to void voluntarily, and to completely empty his bladder.

During the early days of prostatectomy — outside the immediate mortality — there were two things which we most feared. One was tight stricture of the canal, and the other was incontinence of urine.

As to stricture. Fearing that tight cicatricial contracture would result, we used to sound these patients at frequent intervals, commencing soon after the operation and continuing throughout the period of healing. But we soon found that this condition does not take place, and we do not employ sounds as a routine. A large instrument should be passed through the urethra a few days after the operation and a full sized sound should be passed into the bladder once or twice during the period of healing. There is more apt to be an increase of the caliber of the deep urethra than a diminution.

Incontinence of urine. Incontinence of urine has resulted from all the various methods of operating upon the prostate, including mere prostatomy and the Bottini and other methods of galvino cauterization. In this particular I shall only speak of perineal prostatectomy. I believe we shall not have incontinence of urine as a result of perineal prostatectomy if we are able to perform it as it should be done. It all depends on making a proper, clean cut through the membranous urethra with division and not ablation of the fibers of the urethral sphincter, and on conservation of the bladder sphincter. This depends on recognizing the prostatic sheath and making the enucleation entirely within the sheath and close to the prostate, and allowing no stripping or tearing to occur. The prostatic sheath is not the prostatic capsule. It is the reflection of the posterior layer of the deep pelvic fascia. It contains within its meshes the large prostatic plexus of veins. If one unduly lacerate or strip out portions of this sheath, one will have an unnecessary amount of hæmorrhage, during and after the operation. (The prostate may be seen and recognized on opening the prostatic sheath. It is covered with a glistening capsule and presents a characteristic, smooth though often nodular surface.)

As I have said before, if one be able to satisfactorily reach and recognize the prostate within its sheath, and to find the proper line of cleavage so that the gland enucleates without much effort, there should be very little laceration and consequently little or no damage to the bladder neck. When one comes to the portion of the prostate in contact with the prostatic urethra, the sheath is very thin and sometimes the attachment is very intimate. If this be so, it is better to cut through the final fibers with a scissors so as not to make a tear through the bladder neck. Usually the bladder sphincter will contract so that there will not be leakage around a drainage tube of a caliber of thirty-five French. If this be so, I think we may be sure that the bladder will be continent. I believe that the majority of cases show a nearly complete

incontinence when the tube is removed, but when a patient begins to gain control so that he will hold a small quantity of urine, I always feel confident that complete control may soon be expected.

This may be very much hastened if the bladder gymnastics recommended by Alexander be employed as soon as the patient has any voluntary urination and control.

Many patients have practical control ultimately, yet they may have a slight leakage under certain circumstances; for instance, when the bladder is unduly full, or when suddenly startled, they may have a tendency to leak a few drops.

There is one condition which is often mistaken for incontinence; I refer to the dilatation of the prostatic urethra, which is often present after complete healing. This results in a pouch or reservoir in front of the bladder, which will retain a small quantity of urine, after the patient has emptied his bladder. If he has not been successful in emptying this small pouch, the urine will drop from the urethra and it will appear as if there were lack of bladder control.

Removal of obstruction. One may not be sure that he has completely removed all the obstruction unless he can reach his finger tip well within the bladder neck and sweep it around the circumference. Otherwise there may be remaining an intravesical lobe, pedunculated or not. Sometimes the obstruction has been due entirely to an intravesical lobe hinged on a pedicle in such a manner that it acts as a ball valve.

There is one class of cases in which the obstruction is due entirely to a fibrous contracture of the prostate. These are not cases of prostatic hypertrophy but of actual diminution. They are very difficult cases to operate upon and I have always feared in attempting to remove these prostatic "rings" or "collars" that I might produce urinary incontinence, but so far that has not been the case. If there be found an intravesical lobe, it must be removed. If it is sufficiently pedunculated it may be delivered through the bladder orifice and resected at its base. I have done this many times, — often the demonstration is a very pretty one. I believe it is important to remove all palpable prostatic tissue, otherwise recrudescence may occur. In my own series there have been two cases in which regrowth of the prostate took place. In one a small nodule developed within the bladder near its neck some years after the operation. It resulted in a large amount of residual urine, but the urine was uninfected and the patient did not have any symptoms, so he would not submit to further operation. In another case (one of my early ones) there was a very large regrowth, so much so that I feared the man had a carcinoma. This came on some years after the first operation and it caused again a train of severe symptoms similar to those with which he had first suffered. At the first operation I removed three very large lobes. At the second operation I removed two very large masses. Since his second operation, he has regained his health and remains perfectly well, with fully restored bladder function.

I wish to say a word about the one case above referred to, in which I failed to remove the obstructing prostate by the perineal route. The patient was a gentleman in California and his case was quite a remarkable one. An eminent specialist had very carefully examined him with the cystoscope and had found that there was slight hypertrophy of the lateral lobes. He reported that there were no stones present and that there were no large prostatic masses. I had not seen the patient until the day before the operation. At the time of the operation, it seemed to be a case of fibrous prostatic collar with a small lobe projecting within the bladder. I found and removed several stones about the size and shape of large almonds. The bladder was a difficult one to reach. If I had used a modification of the Selcian incision, like the admirable one employed by Hugh Young, I might have been more successful. As it was I was not able to sweep my finger around within the bladder orifice and therefore could not be sure that I had removed all the obstructing mass. The result showed that I had not, for the patient continued to have obstruction with severe symptoms of dysuria. Later I operated upon him by the suprapubic route and found two immense prostatic lobes like sausages lying parallel within the bladder,

and also a large nest of stones (I removed fifteen altogether).

After the suprapubic operation the patient made a prompt and complete recovery. This was a unique and interesting case; there have been many cases where the operation was difficult; in this case it was a complete failure.

This case also showed the fact that the cystoscope is not always an instrument of precision. The gentleman who used it is a man of undoubted skill and ability and yet the instrument failed to reveal two intravesical lobes as large as sausages and fifteen stones which were present.

Cystitis, *pyelitis*, *renal insufficiency*, and *auto-intoxication*, as results of prostatic obstruction, may all be considered under one head. They are the most important elements in the disease. Some of them are the usual causes of death and it is generally on their account that we have to operate. Kidney insufficiency may exist in this connection without the occurrence of infection. It is due to back pressure through the ureters and it plays a very important rôle in many of these cases, as shown by the great improvement these patients make after the operation. Of course, pyelitis acts in a double capacity, i.e., by its septic poisoning, and by its influence on the kidney function. So in these cases we have both a septic poisoning and one due to lack of elimination. Now these conditions have not been cured when we have removed the obstructing prostate. All that we have done is to take away the original cause and to place the patient in a position to ultimately become well.

So our care of these patients should not cease when their wounds have healed, for they need advice and treatment until they have finally outgrown the inflammation and infection. Sometimes this is a very difficult thing to accomplish. Even after we have rendered the bladder perfectly capable, so that it will empty itself, there being no residual urine to stagnate, we may still find it difficult to cure the patient of his cystitis and to rid him of his purulent or bacterial urine. A few cases among those I have been able to follow have had recurrent infections, acquiring practically free urine for a time and then having a period of pyuria.

Last summer one of my patients died. He was a feeble old man with marked renal disease at the time I operated upon him. He made a good recovery and had two years of satisfactory health. His bladder function was perfect, his urine at times was practically clear, but last summer he had an injury to his left testicle which resulted in epididymitis and orchitis with abscesses, accompanied by a marked purulence of the urine. After I opened and drained his testicle he felt well enough to leave town, but exacerbation set in and he died, I imagine, with pyelitis and sepsis, though his death may have been due to uræmia.

Preservation of sexual function. Of this I have very little to say at this time. In the majority of these patients it is a matter of absolutely no importance. They are old men, and the question which usually presents itself and overshadows all others is one of saving their lives. I am confident of this, however, that perineal prostatectomy leaves the sexual function unimpaired in a large proportion of cases. Where I have gone into this question with the patients, I have learned that some of them have regained this function, when it had been absent before the operation. Some of them have absolutely lost the function, apparently as the result of the operation, and others have retained the function unimpaired when it existed prior to the time of the operation. Of course this is a matter of hearsay evidence; we have to take the patient's word for it.

I am sorry to say that at this time I cannot give an analysis in detail of my cases, but I can say this: Outside of the early deaths, the results have been most satisfactory, with very few exceptions. The vast majority of cases have been practically cured. I mean by this, that they have regained or retained their full bladder function, being able to hold their urine and being able to empty their bladders, not requiring the use of the catheter, and that they are relieved of the distressing symptoms which accompany prostatic obstruction, such as frequency, pain, hæmorrhage, cystitis, pyelitis, pyuria, and

the auto-intoxication due to kidney insufficiency.

The regeneration of these patients amounts to rejuvenation. Many a man has been so restored to health as to be apparently ten or fifteen years younger and has been changed from a dying invalid into a healthy individual, able to resume his normal avocation.

A SERIES OF UNUSUAL CASES WITH PATHOLOGICAL CONDITIONS OUTSIDE OF THE BLADDER, PROBABLY APPENDICAL ABSCESSES, CAUSING MARKED VESICAL SYMPTOMS

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THIS group of cases presented, as its cardinal points, signs similar to conditions of, and symptoms chiefly referable to, the urinary tract. In all instances the urine was negative. The symptoms were chiefly desire to urinate, frequency, associated with tenesmus and pain. In all instances a rounded tumor mass could be seen and felt in the suprapubic region, and rectal examination showed a mass which apparently pushed the prostate, seminal vesicles, and bladder downward and backward, and seemed to be, from the shape of the mass, extraperitoneal and attached to the bladder. With bimanual palpation, i. e., with balottement, fluid was positively diagnosed in several instances. With catheterization and emptying of the bladder, the mass was scarcely changed in size, and fluid remained present. For this reason cystoscopy became necessary in order to exclude at once certain conditions.

The gastro-intestinal symptoms were of an insignificant kind, so mild as not to attract the attention of the patient at the time when the urinary symptoms were present. However, previous to the onset of the urinary symptoms, all complained of frequent watery bowel movements. In several instances there had at first been constipation. Later, in several instances, when the tumor swelling persisted, anal tenesmus set in in connection with the urinary symptoms.

To emphasize, the cardinal symptoms shortly after the onset were certainly urinary in character. No marked general symptoms were present at any time, except in the boy, and in the case of the old man, and then only following the perforation or rupture of the abscess.

There can be no question, I believe, that those who treat surgically intra-abdominal and intrapelvic diseases still recognize the possibilities of error in diagnosis. This series of cases I believe can be classified as of appendical origin or as cases of atypical appendicitis with abscess.

As this entire group comprises only patients of the male sex, a large number of conditions which could occur in women can at once be excluded. However, in the differential diagnosis a number of conditions must be taken into consideration.

I appreciate fully that there are many cases of appendicitis that are considered unusual or atypical, and even a definite symptomatology has been set up for certain groups, such as the retrocecal type.

As I was a consultant in all of the cases, different surgeons doing the operating, some of the cases remaining unoperated, and one coming to autopsy, I believe that it is of general interest to go into detail.

The six cases which I will cite are, I believe, comparatively uncommon. They have all been seen within the past two years and seem to belong to one type. During this period of time I have met with two other cases somewhat similar, particularly as regards the urinary symptoms and physical findings. One turned out to be a ruptured bladder taking a chronic course, the other a

diverticulated bladder, the diverticula having ruptured spontaneously. These two cases, however, were strictly vesical in origin, and therefore should not be included in this group.

On account of their unknown origin, except in two of the cases, and on account of their course and termination, I will take the liberty of presenting them.

CASE 1. W. A. B., age 45, clerk, married.

Previous history. Meningitis twenty-five years ago. For past five years has complained of slight gastro-intestinal symptoms, however, not sufficient to cause him to consult a physician. Has been married twenty years and has eight children. He states positively that he has had no venereal infection whatsoever. He was referred to me and admitted to the Alexian Brothers' Hospital on May 13, 1909.

For the past nine years he has had attacks, two or three times a year, similar to the one previous to his operation. They always followed a period of two to four days in which he was constipated, had been eating heavily of food which disagreed with him. These abdominal conditions were almost always accompanied by swelling and slight sensitiveness in the left side of the scrotum. The attacks were never accompanied by nausea or vomiting. All that he noticed was an uncomfortable feeling, not an actual pain, perhaps dull ache, located for the most part in the lower left quadrant of the abdomen. He eats oatmeal, eggs, and fish, and drinks cocoa, tea, and milk. Anything heavier than this brings on an attack.

Present complaint. For some time past has been constipated and four days ago took a large dose of Epsom salts before breakfast. During that day he had several bowel movements but did not feel particularly well. On the second morning following he began to notice severe pain over the entire abdomen. He went to his work but was obliged to quit. He called a physician who prescribed castor oil. This seemed to be effective. The abdominal pain continued, and at the time when I first saw him he complained of great desire to urinate, but he felt after urination as if the bladder remained full. This frequency was accompanied with great pain and tenesmus. Temperature 101.5°F., pulse 110, respirations 18. He had no appetite but did not feel nauseated. Leucocyte count 14,000. Tongue dry and red.

On inspection there was a smooth rounded mass over the pubes, extending above the navel. Palpation and percussion did not elicit any pain in the abdomen. The abdominal muscles were fairly lax. Rectal examination showed a small, non-sensitive prostate; the seminal vesicles could not be outlined, but it was readily noted that the bladder was distended. At what I considered the vesico-rectal peritoneal fold the mass was pushed downward and backward. It could be made out from side to side of the pelvic wall. A mercier catheter was introduced, after trying a soft rubber catheter, which on account of pain and tenesmus, could not be passed. Seven hundred fifty cubic centimeters of clean urine was withdrawn. This was negative both to microscopical and chemical examination. With the catheter still in place and with bimanual palpation, distinct fluctuation of the remaining mass could readily be made out. In the suprapubic region, I was inclined to believe that the mass was more pronounced on the right side. It extended fully two and one half inches above the pubes and seemed to be rounded, extending from side to side. No further fluid could be removed by pressure through the catheter; the mass was apparently slightly movable and balottement made it certain that the content was fluid. The lower portion of the abdomen, below the umbilicus, was dull on percussion. Above the rounded mass the abdomen was soft and slightly tympanitic on percussion.

Cystoscopic examination was accompanied with but slight pain and this only at the time of introduction and turning of the instrument. The bladder showed no pathological condition except congestion. The ureteral orifices were perfectly normal and the internal urethral orifice was slightly edematous. There was no edema bullosum (such as one often sees in women suffering from parametritic conditions).

The patient did not consent to operation until May 18th. During this interval it was necessary to catheterize him frequently, as retention was apparently complete. He was on a light diet. High rectal normal saline douches were frequently given. These caused considerable discomfort. The temperature varied from 99.5°F. to 101.5°F. During this period no chills were noted, but his appetite, sleep, and general condition were not very good. Hot compresses seemed to give him considerable relief.

Operation. The patient was placed in the lithotomy position. The prostate and vesicles were exposed by an inverted V perineal incision. A catheter was introduced and the bladder emptied. A small incision was made in the median line between the seminal vesicles, into the mass which could readily be felt. From 250 to 300 cubic centimeters of purulent sanguinous fluid escaped. The incision was enlarged with a forceps and a finger tip introduced, but nothing unusual could be felt. The cavity was irrigated with normal saline solution and long pieces of plain gauze were inserted for drainage. Gauze was removed daily, and on withdrawal of the last piece on the third day considerable fluid of the same character gushed forth. A small tube was inserted and left in place for several days.

Following the operation the patient could not void his urine and it was necessary to catheterize him several times. The patient

was discharged cured on June 26, 1909, having made a rapid and uneventful recovery. I have seen him frequently since then and he has had absolutely no trouble with the urinary tract, and besides, his slight dyspepsia, as he called it, causes him practically no further trouble.

Previous to operation, and before the above diet was followed he was troubled constantly with constipation and insomnia. Now he sleeps well and his bowels are regular. His operation occurred after he had been suffering from constipation for about a week, during which time he took salts, castor oil, but never a single movement. The abdominal tenderness and dull ache had been present for about three days. Sensitiveness and pain per rectum were not noticed.

Now, fully one and one-half years after operation, he is perfectly free from all former complaints. I am inclined, therefore, to believe that simple perineal drainage, in this as well as the following cases, was sufficient to bring about complete recovery.

CASE 2. J. L., age 32, solicitor.

Previous history. Has always considered himself perfectly well. Has never been obliged to stop work on account of any sickness. The only venereal infection was a gonorrhœa which he acquired two years ago, from which he had no complications to his knowledge. He was well in five or six weeks and believes his urine was free from all shreds.

Present complaint. Five days ago, on a Sunday, about six hours after eating his usual dinner, he commenced to complain of indistinct abdominal pain. He could recall no localized pain or nausea or vomiting. Diarrhœa followed shortly, and during the night he had five or six passages. This continued on Monday and Tuesday, evidently with increasing anal tenesmus. He described the stools as offensive, liquid, and small in amount. The bowel symptoms decreased. Wednesday he was somewhat better. Apparently he had no marked fever, if any. He had no urinary disturbances, although he urinated small quantities each time of stool. He found that he commenced to feel a desire to urinate, but could not do so, and on the following morning called a physician, who catheterized him without difficulty with a soft rubber catheter. He was referred to the Alexian Brothers' Hospital, where the following was noted:

He complained of diarrhœa with tenesmus and at the same time desire to urinate, accompanied with considerable pain. He had no pain in the abdomen, did not feel nauseated, had no appetite and felt extremely weak.

On examination, he appeared to have lost in weight, and had the appearance of suffering from pain. His tongue was dry, furrowed, and red. Temperature was 99.2°F., pulse 86. The abdomen was rigid and on pressure could elicit only indefinite sensitive points. On percussing the suprapubic region, an irregular outline of what was supposed to be the filled bladder was made out.

Examining per rectum, the prostate was readily outlined, and considered normal; both vesicles were atonic and readily felt. Neither prostate nor vesicles were sensitive. The seminal vesicles were, however, markedly pushed downward and could be felt in connection with the bladder, but even above this, there seemed to be a smooth, hard mass. I catheterized the bladder and about 500 cubic centimeters of perfectly clear urine, negative both chemically and microscopically, was collected. On bimanual examination the mass could be made out, although the recti muscles were still rigid. It was believed from the sense of touch that it was fluctuating. The cystoscope was readily introduced and the examination showed a slight congestion of the bladder, most marked around the internal urethral orifice. No distortion was to be noted. Leucocyte count 12,400.

Operation. The following day, July 27th, I operated, placing the patient in the exaggerated lithotomy position, and making an inverted V incision, which exposed the prostate and the seminal vesicles. I made one small incision in the median line between the seminal vesicles, and about 500 cc. of a thin purulent fluid escaped. The incision was enlarged with forceps. On examining again the greater part of the mass had disappeared. A rubber drainage tube was inserted and the wound united in the usual manner. The tube was left in place for forty-eight hours, but there was only a small quantity of secretion in this time. The wound was irrigated daily with 1:1000 formalin solution and for a few days gutta percha tissue drainage was inserted. There was practically no temperature during the entire convalescence. A permanent catheter was introduced at time of operation and left in place for twenty-four hours. From that time on he urinated spontaneously without difficulty. He was discharged from the hospital, perfectly well, on August 27th, one month after operation, and was seen one year later, having been free from all further illness.

CASE 3. G. K., age 34, storekeeper.

Previous history. He recalls no previous illness except gonorrhœa, of which he has had several attacks, the last one several years ago. Some six months ago I was obliged to operate on him for adenitis. At that time I could determine no positive cause, possibly chronic urethritis. About five weeks ago he returned to the hospital for chronic urethral discharge, for which he was treated in the usual manner.

Present complaint. Ten days after leaving the hospital, he returned, having had no bowel move-

ment in six days. He complained of diffuse abdominal pain, chilly feelings, nausea, vomiting, and anorexia. Temperature 99.5°F. He was treated with high rectal enemata, bowels were made to move. On account of business matters he left the hospital while he still felt unwell. On examination he had considerable resistance of the abdominal muscles with some sensitiveness in the right iliac region.

He returned to the hospital twenty-four days later and stated that for the past eighteen days he had been troubled with severe diarrhœa, twenty to twenty-five bowel movements of peculiar odor and appearance in twenty-four hours, sometimes associated with pain in the abdomen and again in the rectum. The pain was apparently worse during the night. Frequency of urination commenced some days ago, without pain or tenesmus, but he complained of a slight burning during and at the end of the act of urination.

On examination, his condition showed that he had lost considerable in weight; he appeared anæmic, 90 per cent hæmoglobin, 11,300 leucocytes. The urine was slightly turbid, which was shown to be due to pus. Temperature 99.8°F., tongue dry and coated.

On examining the abdomen, considerable resistance in the suprapubic region could be made out, but on deep palpation (which caused considerable pain) an indistinct mass could be made out which seemed to lead to the right iliac region. Rectal examination gave rise to great pain. Above the prostate, which was slightly irregular, soft, and sensitive, and behind the seminal vesicles, which could readily be felt as distinct strands, was a mass extending from side to side which was exceedingly sensitive to the touch.

I advised operative interference, which was refused. Rectal irrigations, more or less permanent, were carried out. All this caused him much distress and could not be continued. Hot packs around the abdomen and perineum, with electric light baths, were given with apparent relief. Peppermint water, as a placebo, was given. Patient was on a liquid diet most of the time. In the course of four weeks considerable improvement was noted, the mass was much smaller and rectal examinations were decidedly less painful. He refused to remain longer in the hospital, but I have seen him in the past year and he has regained his weight, and eats and sleeps well and feels perfectly well.

I am inclined to believe that following his departure from the hospital and during the twenty-four days at home the abscess had ruptured spontaneously into the rectum and that the following course showed the incomplete drainage of the abscess cavity and the lengthening of the convalescence during which period he was markedly septic.

This is an example, I believe, of spontaneous rupture with recovery. This would probably be the result also if operation were done through the rectum, on account of the difficulty of thorough drainage and after treatment.

CASE 4. A. Z., age 60, carpenter.

Past history, practically negative. He claims that he has always been well. He denies ever having had a venereal disease.

Present complaint. For the past week he has had no bowel movement, constipation having set in suddenly. Previous to this time they had always been regular. He has complained only of slight pain in the abdomen, not radiating or penetrating. He complained of nausea the last few days, after taking magnesium sulphate. He has taken rectal injections without any effect. He had slight anal tenesmus. At the time of admission to hospital, twenty-four hours before examination, he claimed to have had no chills or fever. On admission his temperature was 99.2°F., pulse full and regular. He had no urinary symptoms up to the time when the attack of constipation set in. Then there was a slightly increased frequency, so that at the time of examination he complained of having to urinate several times the night previous, six or eight times during the day. At the end of each act of urination there was slight tenesmus. Urine examination was negative, microscopically and chemically.

Examination. Temperature, 99°F., pulse, 80. General arterio-sclerosis. Abdomen fairly soft and flaccid. In the suprapubic region a rounded mass, extending up toward the umbilicus, more to the left than to the right could be seen. On palpation there was evident a tumor in the suprapubic region, occupying the position of the filled bladder, about the size of a fœtal head. Deep percussion elicited distinct dullness, while superficial percussion gave a slight tympanitic resonance.

Rectal examination showed a fair sized prostate of good consistency, bulging downward toward the sacrum, and that portion immediately above the prostate gave a sensation of a fairly even, rounded mass. On bimanual palpation this mass seemed slightly movable. Balottement negative. Catheterization showed only a small quantity of urine in the bladder. Cystoscopic examination showed slight trabeculization and a collar-shaped hypertrophy. This examination was made at seven o'clock at night.

The patient was advised to be operated. On account of not being able to communicate with his family, and not deeming the case one of great urgency, I advised operation the following day.

During the night the patient became suddenly worse and went into collapse. At eight o'clock in the morning he died, having never recovered from the collapse and having been conscious practically to the last. He complained of no severe pain.

Autopsy showed the following: Abdomen was opened by linear incision through linea alba. Pus gushed forth as peritoneum was opened. Then a crucial incision was made in the abdominal wall

just above the iliac crests, exposing the entire abdominal contents. The small intestines were found adherent in the lower portion of the abdomen, even to the pubic bones. They were held by old fibrous adhesions. These were broken down, and several loops of gut in the mass were found to be gangrenous. The appendix was found hanging over into the pelvis with a perforation in its middle third. It was closely adherent to the portion of peritoneum covering that portion of the abdominal cavity. On inserting finger into the rectum pus was seen to come from a cavity in front of the adherent bowel and apparently behind the bladder. The adherent intestines were loosened and the abscess cavity was found to be entirely intraperitoneal.

CASE 5. A. T., age 12, schoolboy, seen in consultation with Doctor F. Rettig.

Past history. He had been treated for some cardiac trouble for the past two years.

Present complaint. A week before admission to the hospital he complained of pain in the abdomen, chiefly in the lower portion, constipation, nausea, and vomiting. There was no acute pain at any time. Previous to being brought to the hospital, it had been necessary to catheterize him several times a day on account of complete retention of urine.

Examination. Heart, mitral stenotic murmur; heart extending to the left of the mammary line. Lungs negative. Abdomen slightly distended, a light tenderness in hypogastric region, also in right and left iliac regions. An apparently rounded tumor was found occupying the suprapubic region; after catheterization of the urine, the same condition persisted. Rectal examination showed a soggy mass pushing the small prostate and seminal vesicles and bladder toward the sacrum. No nodules, simply a rounded mass. Temperature 101°F. several days previous to operation.

Operation. Doctor Allport operated. Incision made in the median line halfway between symphysis and umbilicus, two inches in extent, exposing the abdominal cavity, with the release of a large quantity of foul smelling, thin pus. The pus cavity extended mostly to the left. There was no attempt made to break up adhesions, and no further attempt to locate the exact source of the pus. A tube was inserted deep down into the pelvis and other smaller tubes in various directions. Recovery was uneventful.

CASE 6. J. P., age 26, laborer, patient on the service of Doctor O. L. Schmidt, and seen at his request.

Past history. Patient denies all previous sickness, except that two months previous to the present illness he had pain in the abdomen, with nausea and vomiting, all followed by constipation.

Present complaint. Three days previous to admission, early in the morning, he began to feel pain in the epigastric region. He went to work, but the pain became so severe that he was obliged to stop. However, he had eaten a fair breakfast. This disagreed with him, and he was nauseated on the way home and began to vomit. This kept up all that day and the following night. Following the vomiting, his pain became a great deal worse and seemed to be over the entire abdomen, but more pronounced in the right iliac region, but there was severe pain in the left side as well. The following evening he got worse. He was constipated, but there were practically no urinary symptoms.

Examination. Quite emaciated, apparently a loss of weight. Heart and lungs negative. Inspection, abdomen somewhat distended. Palpation, tender over the entire abdomen, severe pain in the iliac regions. Upon deep palpation in the suprapubic region, marked pain could be elicited and a mass extending from left to right could be made out. Rectal examination showed bladder, prostate, and seminal vesicles pushed backward toward the hollow of the sacrum. No fluctuating could be elicited.

Operation. Doctor William Hessert operated. The abdomen was opened in the median line. There were numerous adhesions of bowel and an enormous abscess cavity involving both iliac regions. By careful loosening of adhesions and walling off, a chronic gangrenous appendix with perforation was found. The convalescence was long drawn out, but the patient recovered fully.

In studying these cases, it is desirable to consider the etiologic factor. In every instance the intestinal symptoms were the premonitory symptoms to the predominating vesical signs and symptoms. No typical history of appendicitis could be elicited from any one of them, yet it was sufficiently suggestive, I believe, to permit us to consider this the cause in all six instances. However, there is room for doubting and discussing this point.

The physical findings on inspection, palpation, and percussion agreed to those which are noted in cases of pericystitis. The four cases operated on clearly demonstrated this. The cystoscopic as well as the urinary findings were negative. In three cases no cystoscopic examination was permitted.

Appendicitis frequently gives rise to urinary symptoms, causing pyelitis and ureteritis and ureteral obstruction, and in these cases often there is both pus and blood in the urine, and there may be characteristic inflammatory signs about the ureteral orifice; even turbid urine may be seen to escape with the cystoscope, if a pyelitis or ureteritis is present. If the abscess infiltrates the connective tissue

around the bladder, edema bullosum has been noted. There are also cases of fistula, vesico-appendical and cystoscopically the fistulous opening may be seen. Of the appendical cases recorded in literature I know of none which is similar to these (having presented this paper in May, 1910).

In taking up the differential diagnosis, I naturally have considered diverticula of the bladder, of the rectum, ischio-rectal abscess, periproctitis, periprostatitis, prostatic abscess, seminal vesiculitis, cysts, and new growths of different types. The extent of this paper would be too far reaching if I should attempt to discuss the differential diagnosis. However, I wish to take up some general features which are to be taken into consideration as regards the surgical treatment of this type of cases.

Those familiar with the history of genito-urinary surgery will recall that abscesses of the prostate and seminal vesicles rupture spontaneously into the rectum or through the perineum or even take other paths, and that abscesses of this kind have been attacked through different routes. Similarly with pelvic abscesses in women. The same can be stated of intrapelvic and intra-abdominal abscesses of either male or female. It has been shown to be dangerous to permit spontaneous rupture of abscesses even if imminent signs of their rupture into the rectum are present, and considered surgically, it is not exactly the procedure of choice to open abscesses through the rectum. It has been advised to puncture and evacuate through the rectum and simply drain, or also to apply immediate surgical intervention from above in cases of intrapelvic abscesses.

As these cases show that even with the general knowledge of appendicitis, cases are permitted to advance to this stage, it becomes necessary to advocate surgical procedures to suit this type of case. I shall have to admit that in the procedure advised and carried out by myself in two cases does not permit of the removal of the appendix, but considering the convalescence of the two cases compared to the two operated upon from above in the usual manner — one with the removal of the appendix, the primary focus, and the other simply drained without an attempt to remove the appendix — it was so far superior that there is no comparison to be made. Hence, I am inclined to believe that this procedure should receive consideration at the hands of those who meet similar cases. It, too, can be associated with an operation from above, or the latter, if necessary, could be done later.

It is true that the operation is probably more difficult than the simple puncture through the rectum, but this can be no argument, provided the results are better, and this is still unproven.

It must be admitted that intra-abdominal and pelvic abscesses of this type are not easily handled and certainly the primary focus cannot always be easily removed, even through an adbominal incision. I am inclined to believe that the perineal route, as I have advocated, gives free access and permits of drainage to the outside, and furthermore, permits with great ease the after treatment if any becomes necessary.

CONCLUSIONS

1. That tumors taking on the characteristic shape of a filled bladder may be intraperitoneal, walled-off abscesses, probably of appendical origin.

2. That two of the cases which were operated upon from above gave considerable cause for worry, as the postoperative courses were long and distressing, while the two cases operated upon from below had rapid and uneventful recoveries.

From this and from the case that came to postmortem, and also from the case in which the abscess ruptured spontaneously into the rectum, I am inclined to believe that these are a class of cases which can be operated upon in the manner described, by the perineal route.

TOPOGRAPHY OF THE URETER AS DETERMINED BY THE SHADOWGRAPH CATHETER[1]

By LOUIS E. SCHMIDT, M. Sc., M. D., and HERMAN L. KRETSCHMER, M. D., Chicago, Illinois

EVER since the introduction of skiography combined with fuse wire catheters, as a diagnostic aid for the investigation of lesions in and around the urinary tract, there have appeared numerous articles, with illustrations, bearing directly on this subject. In this connection, we would refer briefly to the publications of Schmidt and Kolischer (1), Bevan and Kretschmer (2), Kummel and Graff (3), Kretschmer (4), Fenwick (5), Lewis (6), Müllerhain (7), Chalzoff (8), Illyes (9), Schmidt and Kretschmer (10), Cabot (11), Englebach, Brown and Carman (12), and Belfield (13).

The fact that stands out most prominently, from a study of the above mentioned illustrations, is that the ureter does not follow the same, or even approximately the same, course in every case. Having noticed this ureteral variability in the work of others, and having also observed it in our own skiagrams made for diagnostic purposes, we believed that it would be of value to determine these differences in individuals who were not suffering from renal, ureteral, or abdominal diseases or deformities, as no systematic work has ever been done, from a clinical standpoint, with the object of mapping out the normal course of the ureter. All our investigations were made on male subjects by the aforementioned method of examination.

Does the course of the ureter, as demonstrated by the shadowgraph catheter, correspond with the descriptions of the course of the ureter given in the text-books on anatomy? It is necessary, of course, to bear in mind the fact that these anatomical findings are the result of cadaver dissections. In text-book descriptions of the course of the ureter the possible differences are not enumerated, nor is attention called to the frequency with which this variability is found to exist, as shown in the work which we have carried out in this series of cases. Gray, Piersol, Garrish, Buchanan, and McClellan do not mention these differences. According to Woolsey, the ureters follow a fairly definite course. We quote from him as follows:

"The ureters lie about 9–11 cm. apart at the commencement, and converging slightly as they descend in the umbilical region, they are about 6.7 cm. to 8.5 cm. apart as they cross the pelvic brim near the sacro-iliac joint to enter the pelvis. They then diverge, following the lateral curve of the pelvic wall to the level of the ischial spine; in this part of their course they lie in front of the internal iliac arteries and cross the obturator vessels and nerves. They then turn inward, and in the male, lie in the parietal attachments of the posterior false ligaments of the bladder in which they run forward and inward to reach the bladder, 3.5 cm. to 4.5 cm. apart and the same distance behind the prostate."

In carrying out this work we have employed the ordinary ureteral catheters, armed with fuse wire. In all the cases, the X-ray pictures were taken with the patients in the prone position. It is a well-known fact that the course of the ureter in the shadowgram appears to be different when the patient is in a semiprone position then when he is in a prone position. Differences are also apparent when the tube is placed at different angles even if the patient remains in the same position. These points were demonstrated by Cabot.

Judging from the work we have done, we believe that the shadows produced by the fuse wire are much more satisfactory than those obtained by injecting solutions of the newer silver salts, particularly for showing the course of the ureter. For the purpose of demonstrating the size, shape, and position of the renal pelvis, solutions of silver salts, such as cargentos, argyrol or collargol, as a routine procedure, give far more satisfactory information than the fuse wire catheter. However, there are cases in which dilated pelves and other pathological conditions in the

[1] Read at the Joint Meeting of the Chicago Medical and Chicago Urological Societies, February 8, 1911.

Fig. 1.

Fig. 2.

Fig. 3.

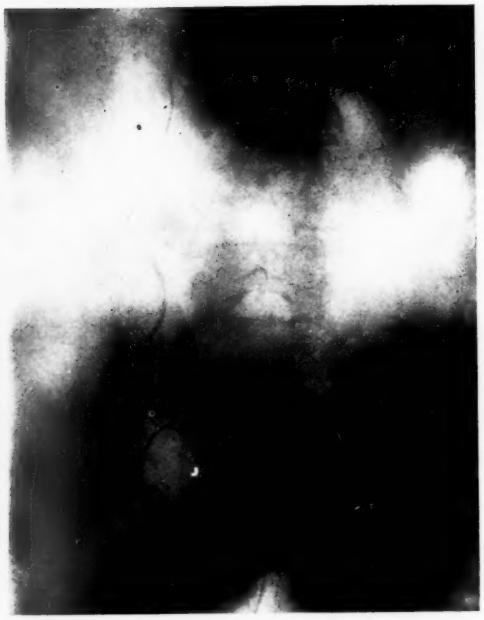

Fig. 4.

Fig. 5.

Fig. 6.

kidney have been diagnosed by the shadowgraph catheter. In this connection it might be well to consider briefly the landmarks given by Fenwick (14) for the purpose of obtaining a ready grasp of shadows occurring in and about the region of the upper ureter and kidney.

The loin space — which appears or should appear in every radiogram of a urinary case — is a space which lies between the shadows cast by the outer edge of the spine, the iliac crest, and the lowest rib. It should be bisected by an imaginary line running vertically from the center of the shadow of the iliac crest to that of the rib. This imaginary line Fenwick calls the mid-ilio-costal vertical line. It divides the loin space into an inner and an outer division. It will be found that shadows outside the mid-vertical line are usually cast by contents of the bowel; shadows inside the mid-vertical are usually urinary shadows, or rarely cretaceous gland shadows, occasionally they may be bowel. In this series of cases, without exception, the ureter and the kidney were well within the mid-ilio-costal vertical line, as can be seen by the accompanying figures.

The illustrations in figures 1, 3, 4, 6, and 10 show that the catheters, after having entered the ureteral orifices, rather abruptly pass outward from the median line toward the lateral wall of the pelvis, forming almost a right angle with an imaginary vertical line drawn through the center of the figures. In figures 2, 7, 8, and 9 the ureters, in their outward course away from the median line, form a more or less acute angle with the above mentioned imaginary line.

In following the course of the ureters upward, we see that they bend inward and cross the sacro-iliac synchondrosis in figures 2, 3, 5, 6, 7, 9, and 10; while on the other hand, in figures 1, 4, and 8 the ureters can be seen lying external to the sacro-iliac synchondrosis.

In figure 2, the two ureters are more or less parallel up to a point corresponding to the anterior superior spines, from which point they diverge from the median line. The iliac spines were marked by connecting them with

Fig. 7.

Fig. 8.

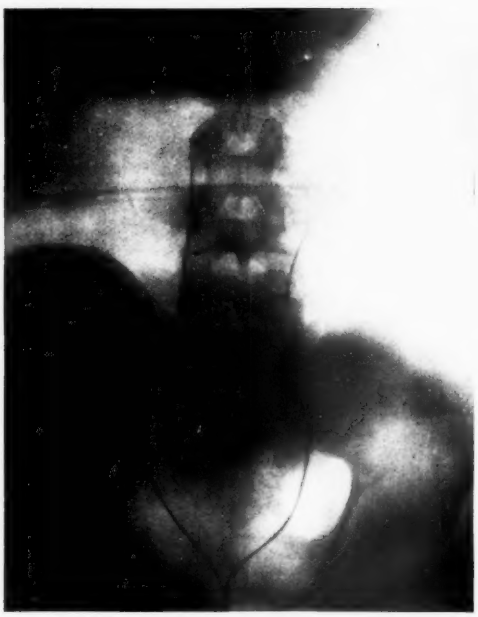

Fig. 9.

Fig. 10.

Fig. 11.

Fig. 12.

fuse wire, which is shown in the figures as the transverse line. In the same manner the position of the umbilicus was marked, as shown in figure 3. Here the course of the two ureters is more or less parallel up to the level of the umbilicus, at which point the left ureter passes upward to the usual position of the kidney, whereas the right ureter stops just above the level of the umbilicus. This difference in height in the termination of the two ureters is also shown in figure 9.

Besides this difference in height, figure 9 shows a difference in the course of the ureters: on the right side the ureter, after crossing the sacro-iliac synchondrosis, passes upward and outward, and at its termination passes outward and away from the median line; on the left side the course of the ureter is steadily upward and inward toward the median line, so that at its termination it lies at the junction of the transverse process with the body of the vertebra.

At its upper end the catheter has a general tendency to pass away from the median line in figures 1, 5, 7, and 9. An S-shaped course is seen in the ureter in figure 5, while figures 4 and 11 show a serpentine course. Figure 1 shows the two ureters very far apart throughout their entire course; at no time do they show any tendency to approach each other as is seen in figures 2 and 3. For purposes of contrast, figure 1 should be compared with figure 9.

In figure 12 the transverse line marks the position of the umbilicus. A difference in the course of the two ureters can be seen both above and below the umbilicus. At its termination above the umbilicus the left ureter passes upward, outward, and then inward toward the median line, whereas the right ureter passes upward almost in a vertical direction.

We recognize the possibility, of course, that the shadowgraph bougie may produce irregularities in and distortions of the course of the ureter. We have found that the fuse wire, because of its pliability, gives rise to less errors of this type than any other material. As previously stated in this paper, these studies were undertaken on persons who were not suffering from disease of the kidney or ureter. In a subsequent publication

we expect to take up a series of pathological cases and discuss in detail the information obtained by this method of examination, its value, and its aid in establishing a correct diagnosis.

We wish to take this opportunity to express our thanks to Brother Ignatius Schneider for the X-ray work which he has carried out for us in these cases.

CONCLUSIONS

1. When judging a skiagram, it is impossible, on account of the great variability of the course of the ureter (as shown by the above illustrations), to state positively whether or not a given shadow is in the course of the ureter, unless the X-ray picture is taken with a shadowgraph catheter in the ureter.

2. Examination with fuse wire catheters, employed in this series of cases, is superior to other methods for determining the topography of the ureter throughout its entire course.

3. The atypical courses of the ureter, as shown above, emphasize the importance of bearing such anomalies in mind, particularly during any operative procedures on the ureter or organs in close proximity to it.

4. This may also explain (at least in part) the ease with which the ureter is injured during operations on neighboring organs.

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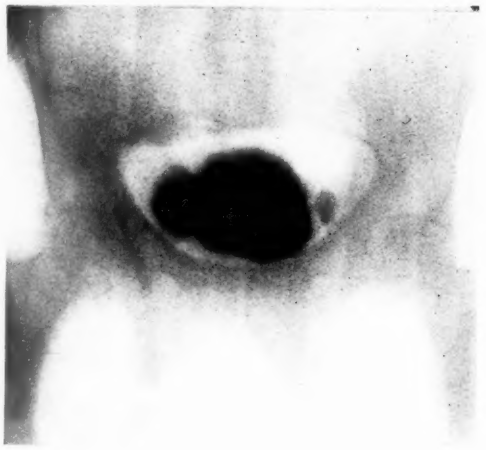
DIVERTICULA OF THE URINARY BLADDER, WITH SPECIAL REFERENCE TO RÖNTGEN RAY DIAGNOSIS

Report of a Case

By JOHN M. GARRATT, M. D., Buffalo, New York

SINCE November, 1910, in every case presenting bladder symptoms, I have practiced distension of the bladder with bismuth solution and at once taking a Röntgenograph. The formulæ of the bismuth solution and technique employed were published in the Journal of the American Medical Association, January 28, 1911. The fourth case presenting itself and examined in this way presented unusually interesting features in that it showed two diverticula. The case is here reported in full.



Date of entry, November 22, 1910. V. W. Aged 70. Married 40 years. No children. Weight 126½ lbs. Occupation was that of a farmer.

Family history. Father died of apoplexy, at 85. Mother died of consumption (?), at 36. Has one

sister living, healthy; one sister dead of appendicitis, and one brother killed in an accident.

Previous history. Had a severe attack of la grippe twenty-five years ago, his only severe sickness. Fell from a load of hay, striking on head and shoulders, three years ago.

Personal history. Negative as to rheumatism, venereal disease, malaria, and hemophilia.

Habits. Smokes tobacco and uses alcohol moderately. No drug habit.

Cutaneous system. Color of the skin and mucous membranes, generally anæmic. Eczema of the legs in summer.

Digestive system. Tongue, uniform thin whitish coating. Complained of a gastric distress, a sense of fullness which is constant. Appetite poor. Bowels costive.

Nervous system. No headache or vertigo. Usually cheerful. Sleeps but little on account of frequent night micturition.

Urinary system. Penis normal when flaccid. During erection he says it is deflected moderately to the left.

Micturition. Day average once an hour. Frequently he has spells in which he has to void urine every fifteen minutes. Night micturition eight to ten times. Voids a fair quantity of urine which always contains a white sediment. Hematuria occasionally after use of catheter; it is slight and noticed only at the end of the act, the last few drops. The stream is small, with little force, at times requires moderate straining. Sudden stoppage occasionally. No dribbling. The pain is severe, smarting and burning during and at end of act. Is increased after exercise.

Present history. Complains of dysuria and pollakiuria, present more or less since 1893, at which time he had an operation for piles by the ligature method. Following closely this operation, he noticed that he could not void his urine as freely as formerly and calls to empty the bladder became more frequent, but not until a year ago were the symptoms severe, and they have been gradually getting worse until the past three months he has had to use a catheter occasionally to empty the bladder. No reflex pains in the scrotum or soles of the feet. A single sample of urine, voided naturally (equally turbid first to last), was saved. Specific gravity 1.018; reaction slightly acid; albumin, a trace. The sediment, which was considerable, consisted of pus, a few normal blood corpuscles and a few round epithelia. Bacteriuria slight. Urethra admits a 17 American sound easily to the bladder. Urethra is very sensitive, especially the prostatic portion. Scrotum is normal. Prostate examined, per rectum, both lateral lobes slightly and equally enlarged.

A Röntgenograph without injection was taken. No calculi were shown.

December 2d. The bladder was irrigated with boric acid solution, capacity eight ounces. It was then injected with the measured quantity of bismuth solution and a Röntgenograph immediately taken. Slight burning sensation lasting one-half hour only untoward effect. As will be seen in the illustration, the outline of the bladder is beautifully demonstrated, also two diverticula, one on each lateral aspect. The one to the left (patient's right) was much the larger and looks to have about one-fifth of the capacity of the bladder. Note the projection of the right lobe of the prostate into the bladder.

December 4th. Cystoscopic examination. Special effort was made to locate the mouths of the diverticula, the bladder was kept moderately distended, but the effort was not successful. The mucous membrane was paler than normal except at the floor of the bladder which was considerably congested and covered with muco-pus. The right lobe of the prostate was shown as much enlarged.

December 14th. The capacity of the bladder was eleven ounces. The bladder was again injected and a stereo-Röntgenograph taken. There were no untoward effects.

December 21st. There were symptoms of acute cystitis. Pain was severe and shooting, and directed towards the penis. The pain was most severe when the bladder was empty. Micturition every fifteen or twenty minutes. Obtained some relief by injecting a small quantity of boric acid bladder solution and with rectal suppositories of opium and hyoscyamus. Moderate orchitis right testicle.

December 31st. Reported best condition in two or three years.

January 18, 1911. Cystoscopic examination with no better success than the first examination.

January 20th. Bladder was injected with 10-oz. bismuth solution and a stereo-Röntgenograph taken. Again were the diverticula beautifully shown; the larger of the two, however, was diminished about one-half in size from previous stereo.

January 23d. He was able to leave for his home in Maine. Day micturition was five or six times; night once, about four or five o'clock in the morning. There was no burning or smarting in voiding urine and he slept sound all night until called to empty his bladder in the morning. His weight was 130½ pounds, and he was much stronger.

March 6th and April 7th. Reports general condition continues to improve.

A 24-hour sample of urine was saved each week. The total 24-hour amount varied from 850 to 2,400 cc., the specific gravity from 1.011 to 1.023. The reaction was invariably neutral or alkaline. Urea, quantity varied from 9.7 to 20.7. A large trace of albumin was present in every sample. The amount of sediment varied from .2 to .4. The first 24-hour sample showed .3. During the acute attack of cystitis it rose to .4. The last sample examined was .2. On two occasions an estimate could not be made on account of the ropy character of the sediment. In making the estimation of the total, the contents of the bottle as soon as possible after saving the total 24-hour amount was shaken and a Purdy

albuminimeter tube was filled with urine to the 10 cc. mark, and 5 cc. of distilled water was added. It was then placed in the centrifuge and the amount of sediment read off in bulk as cc.'s or fraction thereof. The sediment consisted principally of pus, free, and in small tight clumps with more or less blood corpuscles in all samples. The epithelia were of the medium, round, and large pavement variety.

The treatment was directed to keep the bladder clean and to avoid distension. Bladder irrigation with boric acid solution was done every night before retiring. He had daily applications of the high frequency current—D'Arsonvalization, lasting ten minutes—also concentrated arc light focused on the lumbar spine. He was given as a urinary antiseptic salol with oil of gaultheria, as a reconstructive cod liver oil with hypophosphites, and was instructed to drink plenty of water. The bowels were kept loose.

X-ray treatments were given on sixteen occasions between December 8, 1910, and January 25, 1911. The time of each exposure was ten minutes, at a distance of eight inches, the tube being a medium or high vacuum alternately applied over the pubes and perineum. From the third treatment its analgesic effects were noticed, and were progressive except during attack of acute cystitis.

It is perhaps fortunate that the correct diagnosis was made in this case, for the patient was undoubtedly saved much suffering and perhaps serious results would have followed had the usual injections of silver nitrite, formalin, or other irritating substances been used, as is customary in the treatment of chronic cystitis.

The diagnosis of diverticula is not always easy, nor are cystoscopic findings always positive. One symptom was present: After thorough irrigation and the bladder completely emptied a change in the position of the patient allowed a teaspoonful or more of purulent urine to be drawn off. Guthrie's symptom, of doubtful value, "the fluttering blow," was not present.

URINARY BLADDER DISTURBANCES DUE TO INFLAMMATORY CHANGES IN THE PROSTATE AND SEMINAL VESICLES

By IRVIN S. KOLL, B. S., M. D., Chicago, Illinois

ONE can easily understand how inflammatory changes in the prostate and seminal vesicles can cause urinary disturbances if but the anatomical relationship with the base of the bladder is considered. Lying, as they do, in close proximity, they are practically connected by the visceral pelvic fascia which passes inward upon the surface of the levator ani muscle to the side of the prostate and the base of the bladder, and here divides into three layers. One of these layers, termed the vesical, subdivides to encapsulate the prostate, which in turn splits to form sheaths for the seminal vesicles, thus closely attaching these glands to the base of the bladder at its lowest point. Therefore, any pathological process in the vesicles or prostate can easily cause bladder symptoms, which is illustrated by the following cases:

Case 1. M. K., aged 63, referred by Dr. Frank Wright. Complained of pain over the bladder region, extending down the inner surface of the left thigh as far as the knee. This condition had persisted more or less constantly for a number of months. Urination normal. Urinalysis negative. Rectal examination revealed an enlarged left prostatic lobe, quite tender. The consistency was not that of a hypertrophy, but softer, of a "doughy quality," as described by Kolischer[1] as being an edema of the prostate. The cystoscopic picture showed a marked hyperemia of the bas fond, more pronounced toward the left. A few phosphatic incrustations were also seen.

Treatment. The patient was put to absolute rest in bed. Diet was limited to those articles of food which would tend to reduce the acidity of the urine. Two very hot sitz baths and two rectal irrigations were given daily. Rectal suppositories containing extract of belladonna, gr. 1/8, and ichthyol, gr. v, were used three times a day.

In four days the patient was very much improved, and on the eighth day left the hospital completely relieved of his pains.

Case 2. F. G., aged 61, referred by Dr. Ira Frank. For past two years had to urinate three to four times during the night, and constantly had a "pressure sensation" over the bladder. Urinalysis

[1] Kolischer: Edema of Prostate, Ill. Med. J., January, 1911.

negative. Per rectum a tender right lobe and seminal vesicle were palpated. Expressed secretion negative.

The treatment as in foregoing case was instituted, with exception that the patient was allowed to go to his place of business.

Patient was last seen six weeks ago and stated that he was completely relieved of the vesical pressure and frequently sleeps the entire night without having to urinate, and at most gets up but once.

CASE 3. T. B., aged 42, referred by Dr. D'Orsay Hecht. Complains of "heavy, bearing down feeling" over pubes, sometimes burning during micturition. No frequency. Condition first noted three years ago. Urine contained about six to eight leucocytes to low power field. Otherwise negative. Gonorrhœa eighteen years ago. Cystoscopic examination showed that the median lobe projected up into the bladder and was very hyperemic and sensitive, evidenced when beak of cystoscope touched it. Bladder quite normal. Left lobe of prostate somewhat enlarged and exquisitely tender.

When last seen, two months ago, patient was entirely free from any symptoms. Both lobes of prostate considerably diminished in size and tenderness completely gone.

CASE 4. J. B., aged 59, referred by Dr. D. N. Eisendrath. Patient complained of frequent erections. First and second glass of urine clear and microscopically negative. Third glass quite turbid. Expressed secretion showed a large number of leucocytes and many active spermatozoa. Both lateral lobes of the prostate very much enlarged, soft, and exquisitely tender. Unfortunately, I did not again see this patient, but upon inquiry I learn that he is entirely free of his complaint, having carried out the advised treatment at home.

CASE 5. H. K., aged 48, referred by Dr. M. L. Goodkind. This patient, a strong, healthy-looking man, suddenly noted that his urine was "bloody," and also complained of some pain along the left ureter. When first seen by Dr. Goodkind, the urine was port wine in color. Subsequently, for several days, the blood was only microscopic, showing a well packed low power field. No tubercle bacilli were found. X-ray negative. Cystoscopic examination showed a very large median lobe, covered by a severely inflamed mucosa, with diffuse bullæ, giving the combined picture of the so-called "edema bullosa." The rest of the bladder, including the ureteral orifices, was quite normal. Both ureters were catheterized and the urinalysis from both kidneys was negative. Nothing pathological could be felt per rectum.

Patient was put upon a systematic treatment and was discharged from the hospital in two weeks, his urine having been free from any blood upon five consecutive examinations.

CASE 6. C. B., aged 21, referred by Dr. M. L. Goodkind. The only complaint of this patient was a sharp pain at the end of urination, which has been present for the past year. No history of gonorrhœa. Urine showed about fifteen leucocytes to the low power. Otherwise negative findings.

The expressed secretion from the left seminal vesicle contained a great many leucocytes. The vesicle was greatly distended, hard, and very sensitive; the prostate small and apparently normal. Posterior urethroscopy showed quite a little injection of the veru montanum.

Irrigations, suppositories, and sitz baths have been instituted, and in addition "stripping" of the vesicle twice a week. The patient has been under treatment now for three weeks, and has shown some improvement. The vesicle is smaller, and not so sensitive.

SUMMARY OF CASES

CASE 1. In this case the symptoms are accounted for by nerve pressure upon some small branch of either the sacral or lumbar plexus. As soon as the inflammation or edema was reduced the symptoms disappeared.

CASE 2. In this instance I believe the vesical irritability was due to a direct pressure of the enlarged prostate upon the mucosa of the bas fond, since the enlarged lobe tended to project upwards, as determined by the examining finger.

CASE 3. Is explained by the same condition as case 2.

CASE 4. Here there is no question but that the infected prostate irritated either the bulbous urethra or the erector nerves of the penis.

CASE 5. The probable cause of the marked hematuria in this patient was either the rupture of some small blood-vessel of the inflamed median lobe or to a pronounced diapedesis of the extremely hyperemic mucosa covering the median lobe. That the blood did not come from the kidneys or ureters was ruled out by the ureteral catheterization.

CASE 6. This case presents somewhat of a complicated etiology. It is difficult to state whether the chronic seminal vesiculitis causes the greater part of the pain, as explained by the pulling up of the vesicle by the bladder when it contracts at the end of urination; or by the irritation caused by the veru montanum so well gone into by Geraghty.[1] I include this case for what it is worth. At all events, this patient bears future careful observation to clear up the exact cause of his pain.

[1] J. T. Geraghty: Method of Treating Prostatic Utricle. J. A. M. A., March 11, 1911.

CONCLUSIONS

1. The anatomical relation of the prostate and seminal vesicles to the base of the bladder explains how any pathological change in the former can produce symptoms in the latter.

2. It may be impossible to arrive at a diagnosis without urethroscopic or cystoscopic examination.

3. Differentiation must be made between true hypertrophy of the prostate and chronic inflammation.

4. These cases usually yield promptly to the treatment as described.

RENAL DECAPSULATION IN ECLAMPSIA[1]

An Experimental Study[2]

By HUGO EHRENFEST, M. D., St. Louis, Missouri
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RENAL decapsulation is advocated and performed by a number of European authorities as a last resort in desperate cases of eclampsia in which all other known forms of therapy have failed and in which a fatal issue seems unavoidable. According to a compilation of Sippel, out of a total of 46 patients thus operated in a presumably hopeless condition 30 have recovered. This apparently is a most gratifying result. In the meantime, however, Zangemeister has furnished rather convincing proof that the mortality percentage of the decapsulated cases does not markedly, if at all, vary from that of extremely serious cases, not decapsulated. Available statistics, therefore, are still far from proving conclusively the advantage of decapsulation.

Renal decapsulation is advocated for the relief of the one most distressing and ominous symptom of the desperate cases — the insufficient or completely suppressed secretory function of the kidneys. The possible value of the operation lies in its assumed prompt diuretic effect. Decapsulation is proclaimed by Baisch as the best diuretic known at the present time. Again I have to refer to that very interesting paper of Zangemeister already quoted. In it he gives us most important information concerning a physiological oliguria and even complete anuria appearing postpartum. When he guardedly suggests that the generally prevalent belief in the specific diuretic effect of decapsulation will have to be modified in view of the fact that an increased diuresis of necessity must follow this physiological oliguria, his skepticism seems based on observations the importance of which can not be disregarded.

But there is still a third factor which renders the actual value of decapsulation in the therapy of eclampsia rather doubtful. A careful critical analysis of all the various theories which have been advanced to explain the physiological basis of the diuretic effect of this operation tends to show that without exception they are either not plausible or not correct.

A series of experiments made by myself for the purpose of studying the effect of renal decapsulation on the secretory function of the normal kidney, in my belief, furthermore prove that all these theories are based on the erroneous assumption that decapsulation permits a larger amount of blood to flow through the kidney.

It is well known that Edebohls' original advice to decapsulate the chronic nephritic kidney was the result of an accidental observation made at the postmortem examination of a patient who had died four months after a nephropexy. "Enormously dilated and enlarged blood-vessels were found, which penetrated from the fatty capsule through

[1] Read by title at the annual meeting of the American Gynecological Society, May, 1911.
[2] From the Physiological Laboratory of the St. Louis University School of Medicine.

the capsule proper into the kidney substance." Decapsulation, in his opinion, would create an opportunity for the formation of new vascular connections between the blood-vessels supplying the secreting structures of the kidney on the one hand and the blood-vessels and tissues surrounding the kidney on the other. "This increased blood supply and activity of circulation are depended on to improve the working coefficient and gradually to restore the health of the kidney." Consistently, therefore, Edebohls at first suggested to perform the operation in cases of eclampsia during pregnancy for the very purpose of permitting gestation to continue to its normal end. This idea, however, has been repudiated by all obstetricians. The treatment of eclampsia by means of renal decapsulation is not etiologic but symptomatic, therefore, can be resorted to only after all the other known methods of preventing a further introduction of toxic substances have proved futile. The advocates of decapsulation agree that an indication for the operation exists only when even after labor the symptoms of an insufficient renal activity continue. Thus the possible value of decapsulation in eclampsia is dependent upon the immediate effect of the operation and in this respect a gradual establishment of a collateral circulation certainly can not be considered of any practical consequence. It may be stated in this connection that experiments of Liek, Floerken, and others have failed to show the development of such a collateral anastomosis even when the decapsulated kidney, following the suggestion of various surgeons, had been sewed into an envelope formed by omentum.

Since the elimination of Edebohls' original theory of the physiological basis of decapsulation in eclampsia numerous other theories have been advanced. For practical purposes they can be divided into two main groups. One group assumes a direct stimulating effect of the operation on the nerve supply of the kidneys. Edebohls in a later paper says: "I believe that the immediate good effects of decapsulation can be explained by the necessary manipulation, amounting in reality to massage, during the operation." Jaboulay, quoted by Pieri, attributed the changed renal circulation to irritation of the sympathetic fibers in the renal pedicle, which influence vasomotor innervation. Albarran assumed that the diuretic effect was due to vasomotoric influences aroused through the pressing and pulling on the plexus renalis. *Cæteris paribus*, diuresis is proportionate to the amount of blood flowing through the kidneys. Both circulation and diuresis, therefore, could be benefited by the active dilation of constricted arterial vessels in the substance of the kidney. Vasoconstriction possibly plays some rôle in the reduced secretory function of the eclamptic kidney. Nicholson pointed to the fact that various circulatory features which develop during the eclamptic state clearly suggest the presence in the blood of some powerful vasoconstricting substance. Zangemeister suggested that the essential factor in the causation of eclampsia was not a toxin but a general reflectoric contraction of arterial vessels. It must be remembered, however, that more typically the eclamptic kidney is congested, bluish, swollen, and does not exhibit the signs of a contracted condition of its arteries. This undeniable fact makes it impossible to explain the assumed beneficial effect of decapsulation on the basis of a vasodilation.

The second and larger group of theories is based on the principle that the secretory deficiency is due to some mechanical influence which is eliminated by the splitting and removal of the renal capsule.

In 1878 Reginald Harrison stated the fact that in cases of albuminuria and hematuria, accompanied by reduction in diuresis, the incision of the kidney will lead to a prompt improvement of conditions. His presidential address before the British Medical Society in 1901 was entitled: "Renal Tension and Its Treatment by Surgical Means." He explained how the splitting of the capsule will relieve the extreme tension within the capsule. He compared this abnormal intracapsular tension with a similar condition of the eye and as the first spoke of "Renal Glaucoma." In 1904 Sippel found in a fatal case of eclampsia such a typical glaucomatous kidney and suggested, independent from Edebohls, incision or decapsulation of the kidneys as a justifi-

able operation in such cases of eclampsia in which after labor convulsions and deficient diuresis persist. In his belief, this acute incarceration of the renal tissue within its fibrous capsule was the result of an acute venous stasis. In a recent discussion of the various theories concerning the effect of decapsulation Sippel concluded that while this operation, as already stated, does not exert a direct vasodilating effect, it presumably relieves a certain pressure exerted on the veins and thus improves circulation and diuresis. A similar view was expressed by Nicholson who believed that decapsulation drains blood directly from the engorged venous plexuses of the anuric kidney, and that this relief in the venous counterpressure promptly starts an influx of more arterial blood. Edebohls in a later paper also thought that the immediate relief of congestion afforded by the direct abstraction of blood from the organ during operation was of great importance in the promptness of the effect of the operation. Falgowski found the effect of decapsulation to consist in: Improvement of circulation through the relief of intracapsular tension; hastened resorption of accumulated inflammatory exudate on account of the resulting arterial hyperæmia; and restitution of the damaged secreting epithelium with the reestablishment of normal circulatory conditions. In the opinion of Pieri decapsulation relieves an existing congestion and furthers the elimination of detached epithelia or other substances obstructing the canaliculi.

It can be seen that in the belief of all these writers, and more could be quoted, the decapsulation relieves an existing congestion which exerts a harmful effect on the renal parenchyma. Logically, therefore, it would have to be expected that the best result would be obtained with decapsulation in instances of "glaucomatous" kidneys which undoubtedly are in a state of marked congestion. A compilation of Reifferscheid showed, however, that the results of the operation were approximately the same whether the kidneys were found enlarged, bluish, with an apparent increase in intracapsular tension, or small, pale, and soft. The necessity arose for another theory explaining the effect of decapsulation on this latter type of kidneys. This explanation also was furnished by Sippel. He refers to the claim of pathologists that in the soft toxic kidney disturbances of secretory function are due to an edema which through pressure interferes with or completely interrupts circulation in that secondary capillary system which surrounds the tubuli contorti. Sippel assumed that decapsulation permits the escape of the edematous fluid and thus restores circulation in these capillaries. No positive proof has been furnished for this assumption. Gminder doubts the correctness of this theory because the escape of such a serum has never been observed. Its existence, in his belief, would have precluded the generally adopted technique of complete closure of the wound without drain. But I can refrain from a further consideration of this particular theory in this paper, because according to our present physiological knowledge such a disturbance in the circulatory conditions of this capillary system influences the secretory function chiefly only qualitatively and not quantitatively. At present, however, the assumed value of decapsulation still rests solely on the belief in its specific diuretic effect, and to consider alone this effect is the purpose of this paper.

In view of our utter ignorance concerning the actual effect of decapsulation on the eclamptic kidney it seemed desirable to study the influence of this operation on the secretory function of the normal kidney. For this purpose I have performed a series of experiments on seven dogs. A short description of the employed technique may be given.

During all operations and observations the animal was kept in deep ether anæsthesia, which in the various experiments lasted from one-half to six hours. In most instances the decapsulation was performed through a lateral lumbar incision. The kidney was lifted out and the capsule split over a groove director which had been pushed carefully under the capsule. The capsule was pulled off to both sides by means of a dissecting forceps. Extreme care was taken not to manipulate the kidney too roughly or to injure its surface. The hæmorrhage from the decapsulated kid-

ney at times was rather free, probably as the result of the necessarily congested condition of the dislocated kidney. After replacement the hæmorrhage seemed to stop. In kidneys decapsulated for more than 24 hours, at post-mortem examination I never found a hæmatoma in the fatty capsule. For the purpose of observing the diuresis a short laparotomy incision was made exposing the bladder. The ureters were grasped with a clamp near their entrance into the bladder and small openings cut into their lateral wall, into which were tied glass canules. The secretory function of both kidneys was compared by counting the drops coming from the two equally calibered glass canules. No chemical examinations of the urine were made because, as stated, it was my intention to study only the diuretic effect of decapsulation.

The most important features and results of these experiments briefly may be stated as follows:

1. In dogs 1 and 3 the secretory function of each kidney was ascertained before decapsulation. In both animals it was found equal from both kidneys.

2. In dog 2 two experiments were made with direct massage of one kidney exposed by an incision. The diuresis remained unchanged and continued equal with the secretion from the other kidney.

3. In dogs 2, 3, and 4 one of the kidneys was decapsulated in the course of the experiment and the immediate effect of the operation observed.

4. In dogs 4 and 5 one kidney of each animal was decapsulated 48 hours, in dogs 6 and 7 24 hours, before the experiments were started, to determine and compare diuresis from the decapsulated and non-decapsulated kidney of the same animal. In dog 4 one kidney was decapsulated 48 hours before, the other during the experiment.

5. Dog 1 and also dog 5, decapsulated 48 hours before the experiment, died so early in the experiment that the secretory function of the decapsulated and non-decapsulated kidney could not be compared with each other. In the three other experiments it could be ascertained positively that the kidneys decapsulated 48 and 24 hours respectively before the experiment, at the time of the experiment showed approximately the same secretory function as the non-decapsulated kidneys.

6. The immediate effect of decapsulation on diuresis was studied in three instances. In dog 2 the decapsulated kidney remained anuric for three hours. In this case, however, the dog at the time of decapsulation had been under anæsthesia for three hours and was in rather bad shape. In dog 3 anuria was complete for 10½ minutes, then very gradually secretion improved and about 1½ hours after decapsulation was found approximately equal to secretion from the other kidney. In dog 4 the decapsulated kidney remained apparently anuric for the rest of the experiment, i. e., 1¼ hours. At the post-mortem examination, however, the pelvis of this kidney was found slightly distended, containing a few drops of urine. It is possible that some obstruction in the inserted glass tube prevented the escape of a small amount of urine which had been secreted after decapsulation.

7. The same three experiments offered an opportunity to study the immediate effect of decapsulation of one kidney on the secretory function of the other kidney. In dog 2 the other kidney immediately became anuric and also remained anuric for the rest of the experiment, three hours. In dog 3 the following observation seems noteworthy: Before decapsulation 15 drops fell from each canule within approximately 2½ minutes, showing secretion from both kidneys approximately equal. Immediately after decapsulation of one kidney the other remained anuric for a few minutes and then discharged only 10 drops within 7 minutes, 14 seconds. About one-half hour later this kidney discharged 18 drops in 5 minutes, 35 seconds, but diuresis remained distinctly reduced for the rest of the experiment. As already stated, approximately 1½ hours after decapsulation in this case diuresis is equal from both kidneys. In dog 4 the immediate retarding effect of the decapsulation of the left kidney upon the secretory function of the right kidney, decapsulated 48 hours before, also is very pronounced, though the kidney did not seem to

become completely anuric for any distinct time.

8. In five of the dogs salt solution was repeatedly injected through a tube inserted into the jugular vein. The subsequent improvement of diuresis was invariably noticed and was more pronounced if more concentrated solutions, two to five per cent, were used.

The comparative effect of saline transfusion on the decapsulated and non-decapsulated kidney obviously could be studied only after the immediate disturbing influence of decapsulation on the secretory function of both kidneys had completely subsided. Reliable results, therefore, could be obtained only in the cases decapsulated 24 hours or more before the experiment. In this response to the injection of saline solution the decapsulated and non-decapsulated kidney showed no noticeable difference. The increase in diuresis was found the same in both kidneys of the same animal.

9. The normal blood pressure of the dog was found approximately around 135 mm. Hg. In dog 3 it was raised from 120 to 145 by means of adrenalin given in 100 cc. of physiologic salt solution. Immediately before the administration of the drug the decapsulated kidney during an observation of 10 minutes discharged on an average one drop every 59.3 seconds, the non-decapsulated one drop every 41.3 seconds. Twenty minutes after the injection of adrenalin with the blood pressure at 145 the average of the decapsulated kidney had changed to one drop every 25.1 seconds, of the non-decapsulated to one drop every 23.2 seconds.

In dog 4 the pressure was raised from 130 to 145 mm. Hg. by means of digitalis (tct. digital., Mulford). Diuresis before injection of drug: Right kidney (decapsulated 48 hours) 40 drops in 10 minutes, left kidney 37 drops in same time. After injection of digitalis: Right kidney 39 drops in 10 minutes, left kidney 38 drops in same time. In this dog another experiment with digitalis was made after decapsulation of the other (left) kidney. Blood pressure was raised to 190 (pulse 40, respiration 15). At time of death, 15 minutes later, right kidney showed beginning of slow secretion, while left kidney had remained anuric since decapsulation.

In dog 6 one kidney had been decapsulated 24 hours before the experiment. Secretion was found equal in both kidneys when digitalin was injected. It remained perfectly equal. Identical results were obtained in dog 7 with one kidney decapsulated 24 hours previously.

10. In dog 7 (one kidney decapsulated 24 hours) an attempt was made to compare the influence of an increased intraureteral pressure on the secretory power of a decapsulated and non-decapsulated kidney. The canules tied into the ureters were connected by means of rubber tubes with two long vertical glass tubes of equal caliber. The column of urine gradually rose in both tubes. While the rise in the tube connected with the non-decapsulated kidney was even and steady, the column in the other tube, connected with the decapsulated kidney, rose by means of marked oscillations. The column would fall two inches or more and then rise again. These oscillations for a time seemed rhythmic, 24 to the minute, while at the same time respiration was 66, the pulse approximately 180. Later when the column in both tubes was approximately ten inches high, slight oscillations also became noticeable in the other tube. About 15 minutes after the beginning of this experiment both columns of urine apparently had reached their highest level. At that time the level in the right glass tube, connected with the non-decapsulated kidney, was approximately two inches higher than in the other. Immediately afterwards both columns began to sink, the levels finally still showing a difference of two inches, the column in the left tube being the lower. It must be assumed that this fall was due to a beginning relaxation and distension of ureter and renal pelvis.

A number of objections can justly be raised against various features of these experiments. The animals were kept under deep general anæsthesia. The anæsthesia had to be deep, because severe pain may reflectorily inhibit diuresis. Ether was selected as the anæsthetic chiefly for the reason that it is assumed that it shows the least harmful effect on the kidneys. The recent investigations of Cragin and Hull demonstrated that in dogs no noteworthy pathological changes were produced in the kidneys when ether was administered

for two and one-half to three hours. Of my dogs, however, two were kept under anæsthesia four and six hours respectively. Attempts to introduce the finest ureteral catheter directly into the ureters after the bladder had been opened failed. The more complicated, bloodier technique customarily used by physiologists, therefore, had to be employed. A further immediate loss of blood was unavoidable in those cases in which decapsulation was performed in the course of the experiment. While the resulting anæmia necessarily exerted an effect on diuresis, it presumably did not invalidate our observations, because its effect was equal on both kidneys. Investigations were not made on kidneys decapsulated more than 48 hours for two reasons: The experiments of Hall and Herxheimer have confirmed earlier observations to the effect that when the capsule is removed from a healthy kidney, it re-forms early and at the end of from 10 to 21 days is represented by a fibrous covering, thicker and less yielding than the original capsule. Secondly, considering solely the problem of decapsulation in eclampsia, I was naturally interested only in early effects, manifesting themselves within 24 or 48 hours after the operation.

It is obvious that the number of experiments is too small to eliminate the possibility of error in the observations. This possibility, however, is practically eliminated by the fact that I am basing my deductions only on such results of my experiments which in no instance were contradicted by the result of any other experiment.

I feel justified in drawing from my experiments the following conclusions:

1. The immediate effect of decapsulation is a temporary suppression of secretory function in the operated kidney, and a distinct reflectory retardation of diuresis also in the other kidney, at times probably amounting to a complete anuria. This reflectory effect is also exerted on a kidney decapsulated 48 hours previously, but possibly to a smaller degree.

2. From 24 to 48 hours after the operation a decapsulated kidney shows approximately the same secretory activity as the non-decapsulated kidney of the same animal.

3. Between 24 and 48 hours after decapsulation the diuretic effect of an intravenous saline transfusion or of an artificial acute rise of blood pressure is identical in the decapsulated and non-decapsulated kidney of the same animal.

4. In an apparently healthy dog a kidney, decapsulated for more than 24 hours, does not show any noticeable difference from the other kidney in regard to its secretory function under normal or artificial conditions.

This last conclusion, comprising practically the total result of my investigations, in my belief, is of far reaching importance in a critical consideration of the possible value of renal decapsulation in cases of eclampsia. I have already referred to the two main groups of theories. The theoretical reasons have been mentioned which speak against the nervous influence assumed by the one group. My two experiments with direct massage and the fact that all my experiments failed to show any diuretic effect, also prove that the mechanical effect of handling the kidney does not influence diuresis to any marked extent. The other group of theories claim that decapsulation removes the limiting capsule within which the renal parenchyma has become acutely incarcerated. Both these groups implicitly assume that decapsulation promptly increases the amount of blood passing through the kidney, the improvement of circulation finding its immediate expression in a corresponding increase of diuresis. If the presence of the normal renal capsule — nobody claims that in the eclamptic kidney the capsule is contracted — actually is responsible for the development of an acute incarceration of the renal parenchyma as the result of a sudden rise of blood pressure, as is claimed for eclampsia, then in the absence of such a limiting capsule an acute high rise of blood pressure can necessarily have only the effect of a more rapid flow of blood through the kidney. It would seem justifiable to expect that a healthy but decapsulated kidney would respond to this improvement of circulatory conditions with special promptness and distinctness in form of a markedly increased diuresis. My experiments without exception failed to show this expected secretory im-

provement under such artificial influences as saline transfusion or acute rise of blood pressure by means of drugs. My experiments showed that not even under such favorable conditions as absence of a limiting capsule an acute rise of blood pressure results in an immediate marked afflux of blood to the kidney. Therefore, I feel justified in drawing the further conclusion, that these particular results of my experiments must be considered an important argument against the assumption that the eclamptic oliguria or anuria to any noteworthy extent is due to a pathological intracapsular tension developing as the immediate result of the rise of blood pressure during the convulsions. Thus my experiments speak against the validity of all those theories which explain the supposed beneficial effect of decapsulation in eclampsia on the basis of an existing increased intracapsular tension.

There is still one more pressure theory which must be considered in this connection. Experiments made by Hermann and others have shown that an increase in the intraureteral pressure produced, e. g., by compression of the ureter, interferes with and finally entirely stops the secretion of urine. It is assumed that this anuria is the result of a compression of the capillaries in the cortical substance between the unyielding renal capsule from without and the uriniferous tubules from within, which gradually become distended under the influence of the increasing intraureteral pressure. Indeed, Mynlieff bases on this principle his theory of the origin of eclampsia. It could be suggested that the assumed beneficial effect of decapsulation is due to the relief of this particular form of capillary compression. To investigate this point, the special experiment on dog 7 was arranged, already described in this paper. In the vertical tube connected with the kidney, decapsulated 24 hours earlier, the column of urine actually never reached the height of the column in the other tube. The decapsulated kidney thus certainly did not secrete more urine in spite of the fact that the capillaries in the cortical substance of the other kidney must have been subjected to this assumed compression to a much larger degree than in the decapsulated kidney. In the presence of an approximately equal increase of pressure within both ureters the secretory power of the kidney was not benefited by decapsulation, and, therefore, also this theory does not seem acceptable for an explanation of a possible favorable effect of decapsulation in eclampsia.

In my opinion, the results of my experiments weaken or actually explode all the theories so far proposed. These experiments seem to render still more plausible the pessimistic suggestion of Zangemeister that the favorable opinion of certain writers concerning the pronounced diuretic effect of decapsulation probably to a large extent is due to the fact that they were ignorant of the existence of a physiological oliguria or anuria postpartum.

We are forced to the decidedly disappointing but unavoidable conclusion that in the present state of our knowledge any belief in the value of renal decapsulation in desperate cases of eclampsia actually is based alone on the positive assurance of certain authors that they have seen patients recover after this operation who in their belief would have died without it.

It must, however, be emphasized that this skeptical attitude is justified only in relation to eclampsia. While apparently not exerting any noticeable immediate effect on diuresis — which is the all important factor in the question of eclampsia — the operation possibly may create conditions favorable for the final restoration of structural lesions, not progressed so far that they are beyond the possibility of repair. The literature contains numerous reports which conclusively demonstrate an occasional favorable effect on chronic nephritic kidneys. One result of my experiments, not mentioned in the foregoing pages, indeed will call for further investigation and may throw light on the problem of the remote results of decapsulation. At the postmortem examinations of the seven dogs, without exception, the decapsulated kidney was found to be slightly larger, softer, and containing a noticeably larger amount of blood. This marked hyperæmia macroscopically always was most pronounced in the cortical sub-

stance. These conditions, apparently characteristic of the decapsulated kidney, were present also in dog 3, who died only 2½ hours after decapsulation. In dog 4 both kidneys showed a hyperæmic cortex, but it seems noteworthy that the hyperæmia was more pronounced in the left kidney decapsulated only 1¼ hours before death, than in the right, decapsulated 48 hours earlier. My histological studies of these kidneys are not completed and will be reported at a later date. In view of the fact, positively established by my experiments, that decapsulation does not cause an afflux of arterial blood to the kidney and does not improve the circulation of blood through the kidney, I assume that the increased amount of blood in the cortex is due to a passive hyperæmia, which appears immediately after decapsulation and persists for at least 48 hours. As stated, this immediate result of decapsulation will have to be studied in its possible relation to later structural changes in the parenchyma effected by this operation and may be found of importance in the assumed healing effect of decapsulation on the chronic nephritic kidney.

I am under obligation to Dr. J. Louis Swarts for valuable help in these experiments.

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A CONSIDERATION OF RENAL ANOMALIES[1]

With the Presentation of Two Unique Cases

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IT is not my intention to bring before you to-night anything new in renal embryology. A case of extraordinary interest which has recently fallen into my hands has prompted me to present an account of it before this scientific body, with a few remarks on the general topic of renal anomalies, as well as an up-to-date classification of these curious deviations from the normal. I trust that the study of this record may be sufficiently profitable to us all to warrant the necessary expenditure of time.

A UNIQUE CASE

While demonstrating before a class of medical students the various abdominal operations upon the cadaver of a well-nourished woman, 72 years of age, who had died of croupous pneumonia, the anomaly about to be described was accidentally discovered. In order to thoroughly expose the broad ligaments and other pelvic viscera, the classical median incision was made from the pubes to the xiphoid cartilage; this was bisected by a transverse incision through the umbilicus to

[1] Read before the Chicago Gynecological Society, March 24, 1911.

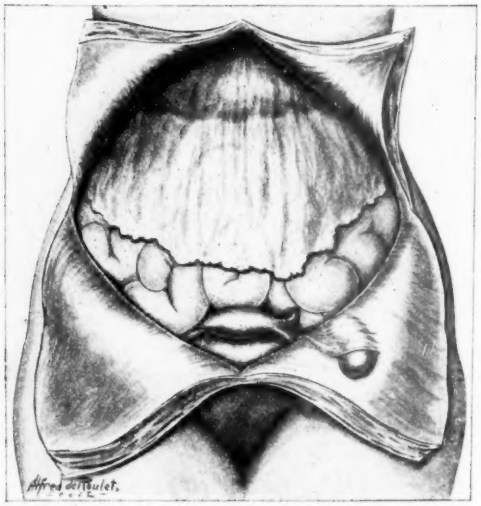

Fig. 1. Mural kidney.

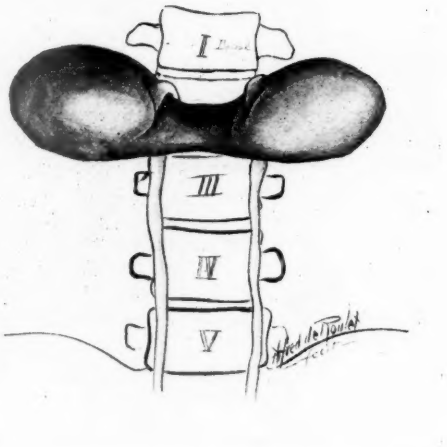

Fig. 2. O'Connor's case of horseshoe kidney. Fusion by the upper extremities with concavity directed anteriorly.

the flanks. The four flaps of the abdominal wall, when rolled back revealed the curious condition shown in the plate. (See Fig. 1.) Upon the left lower flap of the anterior abdominal parietes a small purplish-red growth lay in a somewhat oblique position with its upper rounded extremity projecting from what closely resembled a fob-pocket of peritoneum, which was reflected over the rest of the unusually situated body. An attempt to pick up this structure failed, it being held in its peritoneal sac by a cordlike attachment which extended downward and inward over the pelvic brim. On closer examination it was found to be a kidney, one-third of the normal size, having a small ureter which perforated the bladder-wall in the usual situation, so that the normal shape of the vesical trigone was not altered. The ectopic kidney was normal in shape, but showed slight lobulations, the latter not being nearly so marked, however, as they frequently are in normally situated and fully developed kidneys. A careful dissection proved that the vascular supply of the ectopic organ was derived from a branch of the internal iliac artery, with a corresponding vein emptying into the internal iliac vein. The adrenal was not in evidence. The ureter, which in common with the vessels perforated the kidney at the hilum—which was directed inward and downward toward the median line—was about half the usual size. Section of the ectopic organ discovered typical renal tissue, although the pyramids were not as sharply defined as in a normal kidney. There was no kidney nor adrenal body in the normal situation on the left side, nor were ureter nor renal vessel to be found on that side, nor vestiges that might indicate an attempt at renal formation. The right kidney, adrenal body, and ureter were normal in size and appearance and were normally vascularized. The genital organs were typically developed.

Through the courtesy of Dr. H. L. O'Connor, Pathologist of the Medical Department of Loyola University, I am enabled to record an instance of a horseshoe kidney which varies in two peculiar details from the ordinary type (See Fig. 3) of this anomaly. The specimen was removed from the body of a colored man, 45 years of age. The fused organs lay just above the second lumbar vertebra, and were joined at their upper extremities by a firm band of fibrous tissue. An immense quantity of perirenal fat had pushed the two kidneys forward, so that their lower extremities pro-

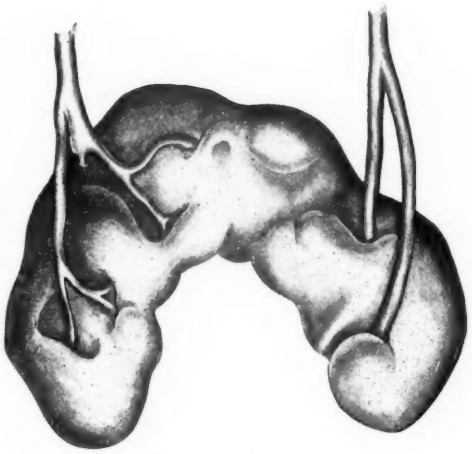

Fig. 3. Specimen from Dupuytren Museum, Paris.

truded anteriorly into the abdominal cavity, and the concavity formed by the union of the two organs was directed toward the anterior abdominal wall instead of downward toward the pelvis. The right kidney was much smaller than the left and was provided with two ureters. The left kidney had one ureter and a greatly enlarged vein. There were two arteries for each kidney, branches of the aorta. The ureters arched upward from the hila of the kidneys and then descended behind the fused organs to follow the usual course to the bladder. There were but two openings into the bladder. (See Fig. 2.)

RECENT CONTRIBUTIONS TO RENAL ANOMALOGY

In common with all the organs and tissues of the body the kidneys are subject to variations from the normal, which variations may pertain to their number, size, shape, position, or vascularization. Such anomalies have been recognized from the earliest times, as may be known by reference to the writings of Spigelus, Laurentius, Sylvaticus, Valsalva, Bauhin, Duretus, Vesalius and others. Only rarely, it is true, do they cause inconvenience during life; indeed, in the vast majority of instances the morbid condition has been dis covered only after death, as in the two cases I record this evening. There can be no doubt, however, that displacements and distortions of the kidneys increase the risk of disease and render uncertain the tenure of life, even if the condition be not recognized.

Some conception of the nature and relative frequency of these curiosities of renal development may be entertained from recent statistics on the subject. Thus, Henry Morris (24) from 1883 to 1893 collected 54 cases of renal malformation as recorded in current literature. These included 11 cases of congenital absence of one kidney; 9 cases of dystopia (ectopic kidney) in its various forms; 8 cases of congenital atrophy or ill-development of one kidney; 8 instances of horseshoe kidney; 5 cases of double ureter, in 2 instances the doubling being on both sides; 2 cases of solitary conjoined kidney; 2 cases of congenital polycystic kidney; 3 cases of congenital hydronephrosis; 2 instances of malformation of the ureter; 2 cases of absence of one ureter; and one case each of congenital atrophy or ill-development of both kidneys, atresia of the vesical orifice of a ureter, and atrophy of a kidney following obliteration of the ureter non-congenital in nature.

In the twelve years since 1898 there have been reported in the world's literature, 121 cases of renal anomalies, which I have collated and classified (see table). With the two anomalies I report to-night we have a total of 123 cases. Of these 36 or 29.2 per cent are instances of horseshoe kidney—the most common abnormality of these organs. There are 24 cases of absence of one kidney—19.5 per cent, while there is but one case of absence of both kidneys. Rudimentary kidney on one side follows with 12 cases, or 9.6 per cent; while dystopia of one or both organs, [including ectopic kidney, 10 cases (8 per cent); pelvic kidney, 9 cases (7.2 per cent); and mural kidney, 2 cases (1.6 per cent)] gives a total of 21 cases, or 16.9 per cent. Eight cases of sigmoid kidney are included in the table—6.4 per cent—and 6 cases of disc-shaped kidney—4.8 per cent. Supernumerary kidneys are reported 5 times—4 per cent; while 4 cases of right- or left-sided double kidney (not fused) are recorded—3.2 per cent. There are three cases of malformation of the kidney, 2 instances of anomalies of

vascularization, and one case of hypertrophy of one kidney, the other organ being normal. The great preponderance of defective renal development in males is shown in the table. While in 30 instances the sex is not mentioned, 66 of the cases, or 53.2 per cent, occurred in males and only 28 in females. In 87 of the cases, or slightly over 70 per cent, the left organ was the defective one—this again demonstrating the already established fact that the left metanephrogenous tract is especially prone to developmental variations. A similar study of 527 cases of renal anomalies, gathered from the world's literature, was made by Gérard (9), in 1905, who arrived at practically the same conclusions as those resulting from my investigations.

TABLE OF RENAL ANOMALIES

1898 TO 1910

1. ALBERTIN (Ann. d. mal. d. Org. Gen.-ur., Paris, 1898, xvi, 337). *Anomaly*, rudimentary kidney, right side, male, age 63. *Ureters*, right side atrophic, scarcely any lumen. *Genital organs* normal. Cause of death, uremia. *Remarks:* Right kidney size of almond; no renal parenchyma, only connective tissue; left kidney dilated, its pelvis containing pus, fetid urine, and calculi.

2. BARLET, J. M. (Lancet, 1904, i, 124). *Anomaly*, supernumerary kidney, left side. *Ureters*, left side two in number, separate to the bladder and opening by two orifices. *Genital organs* normal. *Remarks:* Right kidney normal; two kidneys on the left side, fused together, one resting above the other.

3. BARTH (Arch. f. klin. Chir., Berlin, 1904, lxxiv, 368). *Anomaly*, horseshoe kidney, male, age 19. *Ureters* normal. *Remarks:* The fused organs lay low in the lumbar region united by their *lower* poles, with their *concavity superior*.

4. BIELA VON KARLTREU, A. (Arch. f. path. Anat., Berlin, 1898, clii, 545). *Anomaly*, left-sided double kidney, female of middle age. *Genital organs* normal. *Remarks:* Left kidney depressed and larger than the right. Right kidney absent from its normal site and displaced above the left, lying *horizontally* with its convexity above.

5. BOODY, G. (Medicine, Detroit, 1899, v, 103). *Anomaly*, sigmoid kidney, left side, male, age 65. *Ureters*, two in number, opening into the bladder normally. *Genital organs* normal. Cause of death, pulmonary tuberculosis. *Remarks:* Right kidney large, with its hilum facing the spine. Left kidney below the right, small, deformed, its hilum turned from the spine. Left *adrenal* normally situated, but small. There was a small supernumerary spleen.

6. BRUNCHER (Ann. d. mal. d. Org. Gen.-ur., Paris, 1904, xxii, 1532). *Anomaly*, horseshoe kidney, male, age 32. Ureters normal. Renal artery a common trunk from the aorta dividing into two branches. *Genital organs* normal. Cause of death, heart disease. *Remarks:* The fused organ lay slightly lower than usual, the kidneys united by their *lower* poles with their *concavity superior;* weight 330 grams.

7. BUTTERWORTH, R. (Lancet, June 11, 1904, i, 1651). *Anomaly*, absence of one kidney, left side, male, age 34. *Ureters*, but one, six inches long, running from the posterior aspect of the kidney, with a large lumen, and entering the bladder in the median line. The right renal artery came from the right common iliac. *Genital organs* normal. Cause of death, hemoptysis. *Remarks:* A single kidney in the *median* line, firmly fixed, its upper pole overlapping the aortic bifurcation, the main portion lying between the two common iliacs on the fourth and fifth lumbar vertebræ and the upper segment of the sacrum; lobulated, undersized, hydronephrotic.

8. CADENAT (Bull. et Mém. Soc. Anat. de Paris, 1909, lxxxiv, 223). *Anomaly*, supernumerary kidney, right side. *Ureters*, two on the right side throughout their entire length, both opening into the bladder. Renal arteries, two on the right side. *Genital organs* normal. *Remarks:* Left kidney normal. Right kidney appeared as two organs, the hilum being bridged by tissue, making two secondary hila.

9. CALABRESE (Ann. d. mal. d. Org. Gen.-ur., Paris, 1908, ii, 1841). *Anomaly*, supernumerary kidney, left side, female, age 55. *Ureters*, three in number, the two on the left side uniting before reaching the bladder. Renal arteries and veins normal. *Genital organs* normal. *Remarks:* The supernumerary kidney was observed during life, lying close to the lower pole of the left kidney.

10. CATHELIN (Bull. et Mém. Soc. Anat. de Paris, 1898, lxxiii, 562). *Anomaly*, sigmoid kidney, left side, male, age 2½. *Ureters* normal. Renal arteries, two for the right kidney, one for the left, all springing from the aorta. *Genital organs* normal. Cause of death, broncho-pneumonia. *Remarks:* Rachitic child. Left kidney absent from its normal site. A round lobulated tumor lay on the right side of the spinal column at the level of the third lumbar vertebra, retroperitoneal. The *adrenals* were both normally situated. An atrophic left kidney was fused by its upper pole to the posterior aspect of the right kidney without any line of demarcation. The hilum of the right kidney was directed toward the spine, that of the left kidney away from the spine.

11. CAVERLY, C. S. (Amer. Med., Feb. 20, 1904, vii, 296). *Anomaly*, horseshoe kidney, male, age 16. *Ureters*, right normal, left rudimentary, occluded at the vesical entrance. *Genital organs* normal. Cause of death, killed in a fight. *Remarks:* Left kidney absent from its normal situation. Left *adrenal* absent. Right kidney in normal position, united at its *upper* pole to the left kidney with their *concavity inferior*, the fused organ being fixed to the spinal column at the level of the lower lumbar vertebræ. Right *adrenal* normal.

12. CHEYNE, W. W. (Lancet, January 28, 1899, i, 215). *Anomaly*, supernumerary kidney, right side, female, age 22. *Ureters*, three in number. Renal arteries and veins, each three in number, one to each kidney, springing from the aorta. *Genital organs* normal. *Remarks:* Right and left kidneys normal in size and situation. An independent third kidney on the right side of the lower portion of the spine at the pelvic brim, distant from three to four inches from the right kidney.

13. CORNILLON and GILLET (Bull. et Mém. Soc. Anat. de Paris, 1903, lxxxviii, 565). *Anomaly*, horseshoe kidney. *Genital organs* normal. *Remarks:* The fused organs were joined by their *inferior* poles, with their *concavity superior*. The left kidney showed a voluminous cyst at its lower extremity.

14. CRAGIN, E. B. (Amer. Jour. of Obstet., July, 1898, xxxviii, 36). *Anomaly*, pelvic kidney, left side, female, age 25. *Genital organs* normal. *Remarks:* Right kidney normal. Woman in labor. The distended left kidney was fixed beneath the sacral promontory, its hilum di-

rected upward and to the right. It was removed by vaginal nephrectomy.

15. CRAWFORD, J. (Virginia Med. Semi-Month., Aug. 21, 1903, viii, 246). *Anomaly*, absence of one kidney, right side, female, age 62. The right ureter, artery, and vein were all absent. *Genital organs* normal. Cause of death, dysentery. *Remarks:* Right kidney absent; left kidney very large.

16. CURTIS, W. L. (Med. Herald, St. Joseph, 1905, n. s., xxiv, 14). *Anomaly*, horseshoe kidney, male, age 44. *Genital organs* normal. Cause of death, a wound. *Remarks:* The fused organs were united by their *lower* poles, with their *concavity superior*, and were situated low in the lumbar region.

17. DELMAS and FAY (Bull. et Mém. Soc. Anat. de Paris, 6th s., viii, 1906, 553). *Anomaly*, absence of one kidney, left side, male, age 50. *Ureters*, two from the right kidney. Renal artery and vein absent on the left side. *Genital organs* normal. Cause of death, pyemia. *Remarks:* Left kidney absent; right kidney in the right iliac fossa; normal in shape; greatly hypertrophied; weight 250 grams.

18. IBID. *Anomaly*, rudimentary kidney, left side, male. *Ureter*, on the left side was a fibrous cord extending to the bladder, into which it did not open. Renal vessels on the left side were absent. *Genital organs* normal. Cause of death, cardiac disease. *Remarks:* Left kidney formed an irregular body in the left iliac fossa, the size of a nut; right kidney hypertrophied; weight 230 grams.

19. DENNIS, W. A. (New York Med. Jour., 1905, January 30th, lxxix, 200). *Anomaly*, sigmoid kidney, left side, female, age 26. *Genital organs* normal. Cause of death, uremia after nephrectomy. *Remarks:* Left kidney absent from its normal situation. Right kidney large — 6½ inches long. The left kidney was fused to the lower pole of the right kidney, the mass lying in the lumbar region; there were two hila; weight of the fused organ 6½ ounces.

20. DORLAND, W. A. N. (Surgery, Gynecol. and Obstetrics, Sept., 1911). *Anomaly*, mural kidney, left side, female, age 72. *Ureter* on left side, short. Renal artery and vein sprang from the left internal iliac. *Genital organs* normal. Cause of death, croupous pneumonia. *Remarks:* Right kidney normal; left kidney, one-third normal size, lay on the anterior abdominal wall above Poupart's ligament; slightly lobulated. Left *adrenal* absent; right adrenal present.

21. IBID. *Anomaly*, horseshoe kidney, male, colored, age 45. *Ureters*, three in number, two from the right kidney; but two openings in the bladder. Renal arteries, two for each kidney, coming from the aorta. Left renal vein greatly enlarged. *Genital organs* normal. *Remarks:* The fused organs lay just above the second lumbar vertebra, united by their *upper* poles, with their *concavity anterior*. Right kidney much smaller than the left kidney.

22. FETTEROLF, G. (University of Pa. Med. Bull., 1909–10, xxii, 194). *Anomaly*, of form, right side, female, colored. *Ureters*, normal. Renal arteries, two on the right side coming from the aorta, and three renal veins on the right side. *Genital organs* normal. *Remarks:* Left kidney normal in position, size and shape; right kidney discoid, unusually low in the right iliac fossa, its upper margin at the level of the lower border of the second lumbar vertebra, its inferior margin opposite the lower border of the fifth lumbar vertebra. Weight of the mass, 115 grams; vertical length 9.5 cm., transverse 6 cm., anteroposterior 3 cm. The hilum faced anteriorly.

23. FREDET, P. (Bull. et Mém. Soc. Anat. de Paris, 1903, 6 s., v, 902). *Anomaly*, horseshoe kidney, male. *Ureters*, normal. There were four renal arteries for each side of the horseshoe, all coming from the aorta. The commissural portion had two arteries, also coming from the aorta. There were three renal veins for the horseshoe. *Genital organs* normal. *Remarks:* The fused organs were exceedingly large, trilobed, united by their *lower* poles, with the *concavity superior*.

24. GÉRARD, G. (Jour. de l'Anat. et Physiol., Paris, 1903, xxxix, 176). *Anomaly*, rudimentary kidney, right side, female, age 57. *Ureters* normal. Renal arteries, both anomalous. Two renal veins on the right side; left renal vein anomalous. *Genital organs* normal. *Remarks:* Right kidney very much smaller than the left; length 77 mm., width 37 mm., thickness 18 mm.; the hilum extended almost the entire length of the internal border. The left kidney was also aplasic, but of normal volume. The *adrenals* were normal.

25. IBID. *Anomaly*, rudimentary kidney, right side, female, age 71. *Ureters* normal. Right renal artery and vein anomalous. *Genital organs* normal. *Remarks:* Left kidney normal; right kidney globular and aplasic.

26. IBID. *Anomaly*, rudimentary kidney, right side, female, age 53. *Ureter* of the right kidney occluded at both ends. Right renal artery and vein anomalous. *Genital organs* normal. *Remarks:* Right kidney almost completely atrophied; length 29 mm., width 16 mm., thickness 8 mm.; the kidney was enveloped in much fat. The left kidney was slightly hypertrophied.

27. IBID. *Anomaly*, horseshoe kidney, male babe a few days old. *Ureters* normal. Renal arteries, two on each side. *Genital organs* normal. Cause of death, inanition. *Remarks:* The fused organs were united by their *lower* poles, with their *concavity superior*, lying anterior to the last lumbar vertebræ and connected by a bridge of renal tissue.

28. IBID. *Anomaly*, horseshoe kidney, female, age two months. Right *ureter*, 6 cm. long; left ureter only 44 mm. long. Right renal arteries, two in number coming from the aorta; three left renal arteries (one from the inferior mesenteric, one from the superior mesenteric, one from the left common iliac). *Genital organs* normal. *Remarks:* The fused organs were united by their *lower* poles, with their *concavity superior*, and lay low in the lumbar region. Left kidney lobulated, a semilunar mass, its hilum quadrilateral and on the anterior face of the organ. Left *adrenal* small; right adrenal normal.

29. IBID. *Anomaly*, horseshoe kidney, male, age 17. Renal vessels anomalous on both sides. *Genital organs* normal. *Remarks:* The fused organs were united by their *lower* poles, with their *concavity superior*, and lay at the middle portion of the lumbar column.

30. IBID. *Anomaly*, horseshoe kidney, male, stillborn monster. *Genital organs* deformed. *Remarks:* A celosomic monster. The fused kidneys, their *lower* poles united by a bridge of renal tissue with their *concavity superior*, lay at the postero-inferior portion of the celosomic tumor. They formed a globular mass 34 mm. long, 29 mm. wide, and 18 mm. thick. The *adrenals* were present.

31. GHOSAL, L. (Indian Med. Gaz., Calcutta, 1905, xl, 58). *Anomaly*, right-sided double kidney, female, age 30. *Ureters*, two in number, one from each kidney. *Genital organs* normal. Cause of death, dysentery. *Remarks:* Left kidney absent; two kidneys on the right side, one above the other, resting in the lumbar region. The upper (left) kidney lay a little closer to the liver than usual. Its *adrenal* was normal. The lower (right) kidney had no adrenal. The hilum of the left kidney was normal in position; that of the right kidney was situated on the anterior surface of the organ.

32. GLAZEBROOK, L. N. (Nat. Med. Rev., Washington, 1898–9, viii, 427). *Anomaly* of vascularization on both sides, male, age 73. *Ureters*, eight in number, three on the right side uniting to form one, and five on the left side uniting to form one. Renal arteries, two for each kidney, all coming from the aorta. *Genital organs* normal. Cause of death, alcoholism.

33. IBID. (New York Med. Jour., July 22, 1905, lxxxii, 174). *Anomaly*, absence of one kidney, left side, female, age 38. *Ureter* and renal vessels on the left side absent. *Genital organs* normal. Cause of death, alcoholism. *Remarks:* Left kidney absent; right kidney large but otherwise normal. Right *adrenal* normal; left adrenal absent.

34. GRONNERUD, P. (Jour. Am. Med. Assoc., vol. xlix, No. 8, Aug. 24, 1907, 690). *Anomaly*, disc-shaped kidney, right side, male. *Ureteral* orifice in trigone for the left kidney much higher than that for the right kidney. Renal vessels normal. *Genital organs* normal. *Remarks:* Left kidney slightly below its normal position; right kidney displaced below the left, both having a common fatty capsule, but with a depression around the mass indicating the upper limit of the right and the lower limit of the left kidney. Parenchyma fused by connective tissue; two distinct pelves.

35. GUITERAS, R. (St. Louis M. and S. Jour., 1903, lxxxiv, 129). *Anomaly*, absence of one kidney, right side, male, age 21. *Ureter* and renal vessels absent on the right side. *Genital organs* normal. Cause of death, uremia after operation. *Remarks:* Left kidney in normal position, but diseased; removed by operation.

36. IBID. *Anomaly*, absence of one kidney, right side, male, age 30. *Ureter* and right renal vessels absent. *Genital organs* normal. Cause of death, bronchitis. *Remarks:* Left kidney in normal position.

37. IBID. *Anomaly*, absence of one kidney, left side, male, age 25. *Ureter* and renal vessels absent on left side. *Genital organs* normal. Cause of death, typhoid fever. *Remarks:* Left kidney and *adrenal* absent; right kidney lobulated.

38. HALLER (Bull. et Mém. Soc. Anat. de Paris, 1909, lxxxiv, 309). *Anomaly*, absence of one kidney, right side, male, age 52. *Ureter* and renal vessels on the right side absent. *Genital organs* normal. Cause of death, pneumonia. *Remarks:* Right kidney absent; right *adrenal* normal and in normal position. Left kidney in normal position, slightly hypertrophied, left *adrenal* present.

39. HAND, A. (Tr. Path. Soc. of Phila., 1898, xviii, 323). *Anomaly*, horseshoe kidney, male, newborn. Imperforate rectum and hypospadias. Stillborn. *Remarks:* Fused organs low in lumbar region, united by their *lower* poles, with their *concavity superior*.

40. IBID. *Anomaly*, horseshoe kidney, male, age 8. *Genital organs* normal. Cause of death, sarcoma of the anterior mediastinum. *Remarks:* Fused organs low in lumbar region, united by their *lower* poles, with their *concavity superior*.

41. HARDING, H. W. (Proc. Anat. Soc. of Gr. Britain and Ireland, 1898–9, 5). *Anomaly*, pelvic kidney, left side, male. *Ureter* on left side emerged from the anterior aspect of the organ. Renal arteries, two on left side (one from the aorta and one from the median sacral) and two left renal veins. *Genital organs* normal. Cause of death, insanity. *Remarks:* Right kidney normal; left kidney lay with its upper pole one inch below the aortic bifurcation, parallel to and over the left iliac vessels; non-adherent.

42. HAUCH (Hospitalstidende Kjöbenhavn, 1908, 5 R, i, 281; Münch. med. Woch., 1908, 16, 868). *Anomaly*, absence of both kidneys, male infant, age ¾ hour. *Ureters* and renal vessels absent. *Genital organs* normal. Cause of death, inanition. *Remarks:* Oligohydramnios; weight of child, 2200 grams; length, 48 cm.; lived ¾ hour; died cyanosed. Both kidneys absent. Left pes valgoplanus.

43. HAUSER, G. (Bull. et Mém. Soc. Anat. de Paris, 1898, lxxiii, 498). *Anomaly*, horseshoe kidney, female, age 53. *Ureters* normal. Left kidney had three arteries and the right kidney two arteries, all coming from the aorta. *Genital organs* normal. *Remarks:* Fused organs normally situated, united by their *lower* poles with their *concavity superior;* tendency to lobulation.

44. HEINER, G. (Folia urologica, Leipzig, 1908–9, iii, 186). *Anomaly*, disc-shaped kidney, right side, male, age 20. *Ureters*, two in number, left below. Renal arteries, five in number, all from the aorta. *Genital organs* normal. *Remarks:* Right-sided disc-shaped kidney, the left kidney forming the lower portion.

45. IBID. *Anomaly*, right-sided double kidney, male, age 38. *Ureters* normal. *Genital organs* defective on the left side. *Remarks:* Both kidneys lay on the right side.

46. IBID. *Anomaly*, absence of one kidney, right side, male, age 40. *Ureter* and renal vessels on right side absent. *Genital organs* defective on right side. *Remarks:* Right kidney absent; left kidney in normal position, showing compensatory hypertrophy.

47. HERBET, H. (Bull. et Mém. Soc. Anat. de Paris, 1904, lxxix, 77). *Anomaly*, pelvic kidney, left side, male. *Ureter* on left side short and dilated. Renal arteries, two on left side (one from the aorta and one from the hypogastric) and three on the right side, all from the aorta. Two left and three right renal veins. *Genital organs* normal. *Remarks:* Left kidney half its normal size, lying at the level of the fifth lumbar vertebra and first two sacral vertebra, convexity anterior, hilum posterior. Left *adrenal* in normal position. Right kidney slightly hypertrophied, depressed, its lower pole at the fourth lumbar vertebra.

48. HORAND, R. (Lyon méd., 1905, civ, 718). *Anomaly*, absence of one kidney, right side, male, age 3½ months. *Ureter* on the right side crossed the median line and ran up to left kidney (which, embryologically, should have been the right kidney). Left ureter atrophic. Renal vessels absent on right side. *Genital organs* normal. Cause of death, athrepsia. *Remarks:* Right kidney absent; right *adrenal* present but atrophic. Left kidney lobulated.

49. JOHNSON, A. B. (Ann. of Surgery, 1908, xlvii, 797). *Anomaly*, pelvic kidney, left side, male, age 12. *Ureter* on left side three inches long, but dilated. Left renal vein emptied into the internal iliac vein; left renal artery from internal iliac. *Genital organs* normal. *Remarks:* Left kidney retroperitoneal, obliquely placed, malformed, lying in front of the left sacro-iliac synchondrosis, and showing pyonephrosis.

50. KRÖNLEIN (Berl. Klin. Woch., 1900, No. 19). *Anomaly*, absence of one kidney, right side, male. *Genital organs* normal. Cause of death, uremia after operation. *Remarks:* Left kidney removed for disease.

51. LACASSE, M. R. (Bull. et Mém. Soc. Anat. de Paris, 1904, lxxix, 66). *Anomaly*, horseshoe kidney, stillborn fœtus of eight months. *Ureters*, three in number, two from the right kidney uniting to form one. Three renal arteries, all from the aorta. *Genital organs* normal. *Remarks:* Fused organs united by their *lower* poles, with their *concavity superior*. *Adrenals* in normal position. The kidney showed three lobes, each having a ureter.

52. LAIGNEL-LAVASTINE and P. BLOCH (Bull. et Mém. Soc. Anat. de Paris, 1904, lxxix, 350). *Anomaly*, horseshoe kidney, female. Ureters normal. In addition to the usual renal arteries there was a small artery for the bridge.

Genital organs normal. *Remarks:* Fused organ lay low in the lumbar region, united by the *lower* poles, with the *concavity superior.*

53. LECONTE, M. (Bull. et Mém. Soc. Anat. de Paris, 1908, lxxxviii, 61). *Anomaly*, absence of one kidney, left side, male, age 70. *Ureter* of left side absent; only one ureteral orifice in the trigone. Left renal veins absent; two right renal veins. *Genital organs* normal. Cause of death, meningitis. *Remarks:* Left kidney absent; right kidney normally situated, and about double size.

54. MCARTHUR, L. L. (St. Paul Med. Jour, 1908, x, 440). *Anomaly*, supernumerary kidney, left side, male, middle age. *Genital organs* normal. *Remarks:* Accessory rudimentary kidney on the left side.

55. IBID. *Anomaly*, rudimentary kidney, right side, male, middle age. *Genital Organs* normal. *Remarks:* Right kidney smaller than that of a newborn child. Left kidney large, filled with calculi.

56. IBID. *Anomaly*, pelvic kidney, left side, female, age 14 months. *Ureter* on left side two inches long, widely dilated. Left renal artery came from the left iliac, and the left renal vein emptied into the left iliac vein. *Genital organs* normal. *Remarks:* Left kidney, *congenitally cystic*, lay in the mesial line, *immediately behind the symphysis pubes;* spheroidal; retroperitoneal.

57. IBID. *Anomaly*, horseshoe kidney, female, age 19. *Genital organs* normal. *Remarks:* Fused organs lay in the median line in front of the last lumbar vertebræ. A central isthmus extended across the vertebræ. Each kidney was a flattened ovoid, resting one in front of each sacro-iliac synchondrosis; retroperitoneal.

58. M'MURRICH, J. P. (Jour. Anat. and Phys., London, 1897–8, xxxii, 652). *Anomaly*, sigmoid kidney, right side, male, age 46. *Ureters* normal. Renal arteries seven in number (three from the aorta, one from the right common iliac, and three from the left common iliac); eight renal veins. *Genital organs* normal. Cause of death, carbuncle. *Remarks:* Crossed dystopia of the right kidney with fusion. No trace of kidney in right side. A large organ lay in the left lumbar region with its upper edge at the usual level of the left kidney; its lower border slightly overlapped left common iliac artery. Above it overlapped the abdominal aorta. Its lower end was carried out giving it an oblique position. The upper kidney was comma-shaped, lying upon and embracing the upper and outer portion of a discoidal mass (lower kidney). Right kidney was fused with the anterior surface of the lower and inner portion of the left kidney. The hilum of the right kidney was on the anterior surface.

59. MANSON, J. S. (Brit. Med. Jour., ii, Dec. 28, 1907, 1827). *Anomaly*, absence of one kidney, right side, male, age 59. *Ureter* and renal vessels on the right side absent. *Genital organs* normal. Cause of death, shock from accident. *Remarks:* Right kidney absent; left kidney considerably enlarged.

60. MARTIN, J. C. (Brit. Med. Jour., ii, July 4, 1903, 17). *Anomaly*, horseshoe kidney, female, age 50. *Ureters*, two in number, uniting three inches from the kidney to form one ureter which entered left side of bladder. Two distinct sets of renal vessels. *Genital organs* normal. Cause of death, pneumonia. *Remarks:* Fused organ lay on the vertebræ immediately below pancreas; the mass was nine inches long, joined by the *lower* poles, with the *concavity superior.*

61. MENNACHER (Frankfürter Zeitsch. f. Path., Wiesbaden, 1909, iii, 234). *Anomaly*, sigmoid kidney, right side, male, age 5. *Genital organs* normal. Cause of death, pseudoleukemia. *Remarks:* Right kidney absent from its normal position; left kidney normally situated; right kidney lay beneath it with its upper pole fused to the lower pole of the left organ.

62. MEYER, O. (Beitrag. z. Path. Anat. u. z. allgem. Path., 1908, xliv, 1). *Anomaly*, pelvic kidney, left side, male, age 26. *Ureter* on left side short. Renal arteries three in number, one right and two left, all from the aorta; two right renal veins emptying into the vena cava. *Genital organs* normal. Cause of death, pulmonary tuberculosis. *Remarks:* Right kidney normally situated; left kidney small, lying on left pelvic wall, lower pole at middle line, the upper pole resting near linea innominata. Left *adrenal* in normal position; right adrenal normal.

63. IBID. *Anomaly*, ectopic kidney, left side, stillborn male infant. *Ureter* on left side short. Two left renal arteries, coming from the aorta, and two left renal veins (one emptying into left common iliac and one into inferior vena cava). *Genital organs* normal. *Remarks:* Right kidney normally situated; left kidney lay on the pelvic brim, its upper pole under the aortic bifurcation. Left *adrenal* in normal position.

64. IBID. *Anomaly*, ectopic kidney, left side, stillborn male fœtus. *Ureter* on left side short. Three left renal arteries (two from the aorta, one from the right hypogastric); one right renal artery from the superior mesenteric. *Genital organs* normal. *Remarks:* Right kidney normally situated; the left kidney lay on the brim of the pelvis.

65. IBID. *Anomaly*, ectopic kidney, right side. Renal vessels anomalous. *Genital organs* normal. *Remarks:* Right kidney lay on the pelvic brim.

66. IBID. *Anomaly*, ectopic kidney, right side. Renal vessels anomalous. *Genital organs* normal. *Remarks:* Right kidney rested on the pelvic brim.

67. IBID. *Anomaly*, pelvic kidney, right side, female. Three right renal arteries (one from the aorta, one from left common iliac, one from right common iliac) and two right renal veins. *Genital organs* normal. *Remarks:* Right kidney lay on right wall of pelvis, its upper pole near aortic bifurcation.

68. IBID. *Anomaly*, right-sided double kidney in a 3 weeks' baby. Renal arteries three in number (two for the left kidney), all from the aorta. *Genital organs* normal. *Remarks:* Right kidney normally situated; left kidney lay under the right in the superior strait of the pelvis, *crosswise*, with its upper pole under the right kidney, and its lower pole in linea innominata. Left *adrenal* normally situated.

69. IBID. *Anomaly*, horseshoe kidney. Renal arteries, five for the left kidney (one from the superior mesenteric and four from the aorta) and two for the right kidney (one from the aorta and one from the superior mesenteric). *Genital organs* normal. *Remarks:* Fused organs joined by their *lower* poles with their *concavity superior;* the bridge extended over the aortic bifurcation. *Adrenals* normal.

70. IBID. *Anomaly*, horseshoe kidney. Three renal arteries, one for the right kidney from the aorta, and two for the left kidney (one from the aorta and one from the superior mesenteric). *Genital organs* normal. *Remarks:* The fused organs, lying just above the aortic bifurcation, united by their *lower* poles, with the *concavity superior.*

71. IBID. *Anomaly*, horseshoe kidney. Four renal arteries, two for the left kidney from the aorta, and two for the right kidney (one from the aorta and one from the superior mesenteric). *Genital organs* normal. *Remarks:* Fused organs, lying low in the lumbar region, united by their *lower* poles with their *concavity superior.* The bridge had three arteries from the aorta.

72. IBID. *Anomaly*, horseshoe kidney. Three renal arteries, one large artery from the aorta for the right kidney, and two for the left kidney from the aorta. *Gen-*

ital organs normal. *Remarks:* Fused organs low in the lumbar region, united by their *lower* poles, with their *concavity superior.*

73. IBID. *Anomaly,* horseshoe kidney. Three renal arteries, two for the right kidney from the aorta, and one from the aorta for the left kidney. *Genital organs* normal. *Remarks:* Fused organ, united by their *lower* poles with their *concavity superior,* lay just above the aortic bifurcation.

74. IBID. *Anomaly,* horseshoe kidney. Four renal arteries, two for each kidney from the aorta. *Genital organs* normal. *Remarks:* Fused organs, united by their *lower* poles with their *concavity superior,* lay just above the aortic bifurcation.

75. IBID. *Anomaly,* disc-shaped kidney, stillborn male fœtus. *Genital organs* normal. *Remarks:* Kidney very broad, lying mesially over the aortic bifurcation.

76. MILLER, J. (Journ. Anat. and Phys., London, 1908–9, xliii, 192). *Anomaly,* ectopic kidney, right side, male, age 48. *Ureters* normal. *Genital organs* normal. Cause of death, intestinal obstruction. *Remarks:* Left kidney normal; right kidney lay between the common iliacs on the intervertebral disc between the fourth and fifth lumbar vertebræ, the body of the fifth lumbar vertebra, the disc between the fifth lumbar vertebra and the sacrum, and a small portion of the sacrum; retroperitoneal; resting on the pelvic brim; its hilum directed anteriorly. Length of kidney 3¾ inches.

77. MONOD, C. (Bull. et Mém. Soc. de Chir. de Paris, 1905, n. s., xxxi, 82). *Anomaly,* absence of one kidney, left side, male, age 64. Left *ureter* absent; right ureter dilated and containing a calculus. Left renal vessels absent. *Genital organs* normal. Cause of death, uremia. *Remarks:* Left kidney absent; right kidney hypertrophied.

78. MOORE, F. C. (Jour. Anat. and Phys., London, n. s., xiii, 1899). *Anomaly,* absence of one kidney, right side, male, age 55. *Ureter* absent on right side; only one opening in bladder. Renal vessels absent on right side. *Genital organs* absent on right side; larger than normal on left side; left lateral lobe of prostate larger than right. Cause of death, rectal cancer. *Remarks:* Right kidney absent. Right *adrenal* present in normal situation. Left kidney in normal position, much larger than normal; lower pole reached to one-half inch of iliac crest; upper pole in contact with spleen.

79. IBID. (Jour. Anat. and Phys., London, 1903–4, xxxviii, 71). *Anomaly,* absence of one kidney, right side, male, age 35. *Ureter* absent on right side; only one opening in bladder. Right renal vessels absent. *Genital organs* normal. Cause of death, cardiac failure. *Remarks:* Right kidney absent; right *adrenal* absent. Left kidney normally situated; enlarged.

80. IBID. *Anomaly,* absence of one kidney, left side, male, age 50. *Ureter* and renal vessels absent on left side. *Genital organs* absent on left side. Cause of death, pneumonia. *Remarks:* Left kidney absent; left *adrenal* absent. Right kidney normally situated, enlarged, markedly lobulated.

81. MULLER, TAVERNIER and CHALIER (Lyon méd., 1906, cvii, 1094). *Anomaly,* horseshoe kidney, male. *Ureters* normal. Renal vessels anomalous. *Genital organs* normal. *Remarks:* Fused organs lay in lumbar region united by their *lower* poles with their *concavity superior;* higher on left side; upper border at level of inferior mesenteric artery; lower border, convex, at fourth lumbar vertebra, 2 cm. above the aortic bifurcation.

82. NASH, W. G. (Lancet, April 18, 1908, i, 1151). *Anomaly,* horseshoe kidney, female, age 16 months. *Genital organs* normal. *Remarks:* The fused organs, retroperitoneal, were united by their *lower* poles by a white fibrous band; their *concavity* was *superior;* there was hydronephrosis of the left kidney, which was removed.

83. NELSON, P. (Brit. Med. Jour., Nov. 21, 1903, ii, 1333). *Anomaly,* absence of one kidney, right side, female, age 20. *Ureter* on right side could be traced up from the bladder for three-fourths inch, its upper end occluded. Renal vessels on right side absent. *Genital organs* normal. Cause of death, uremic convulsion. *Remarks:* Right kidney totally absent; right *adrenal* present; left kidney atrophic; length 2½ inches, breadth 1¼ inches, weight 2¼ ounces; capsule adherent and thickened; renal tissue fibroid. Left *adrenal* slightly enlarged.

84. NEWMAN, D. (Glasgow Med. Jour., 1898, l, 144). *Anomaly,* mural kidney, right side, male. *Genital organs* normal. *Remarks:* Right kidney fixed above Poupart's ligament, simulating a perityphlitic abscess two inches broad, lying parallel with Poupart's ligament.

85. IBID. *Anomaly,* ectopic kidney, left side. *Genital organs* normal. *Remarks:* Left kidney displaced, its lower border immediately above the center of the iliac crest; slightly lobulated, normal in size.

86. IBID. *Anomaly,* ectopic kidney, right side. *Ureter* on right side short; entered upper aspect of bladder. *Remarks:* Right kidney convexity rested on pelvic brim, its concave surface directed upward.

87. IBID. *Anomaly,* pelvic kidney, right side. Two right renal arteries (one from the aorta, one from right common iliac). *Remarks:* Right kidney at pelvic brim below the aortic bifurcation.

88. IBID. *Anomaly,* ectopic kidneys (both sides). *Remarks:* Right kidney small, without a hilum, lying to right of sacral promontory. Left kidney in left iliac fossa.

89. IBID. *Anomaly,* ectopic kidney, right side. *Ureter* on right side comes from anterior aspect of the organ. Two right renal arteries from the aorta just above the bifurcation. *Genital organs* normal. *Remarks:* Right kidney flat oval, normal size, situated at the pelvic brim. Left kidney normal size, slightly lobulated.

90. IBID. *Anomaly,* absence of one kidney, left side. *Ureter* on left side absent; only one opening into the bladder. Renal vessels absent on left side. *Genital organs* normal. *Remarks:* Left kidney absent. Right kidney showed compensatory hypertrophy, normal in position.

91. IBID. *Anomaly,* absence of one kidney, left side. *Ureter* on left side absent; one opening into the bladder. Renal vessels on left side absent. *Genital organs* normal. *Remarks:* Left kidney absent; right kidney normal.

92. IBID. *Anomaly,* rudimentary kidney, left side. Left *ureter* single. *Genital organs* normal. *Remarks:* Left kidney extremely atrophic; had a double branched pelvis, no hilum; size of a walnut. Right kidney normal.

93. IBID. *Anomaly,* rudimentary kidney, left side. *Ureter* absent on left side. *Genital organs* normal. Cause of death, Bright's disease. *Remarks:* Left kidney atrophic, weight one-half ounce, very little renal tissue. Right kidney seat of advanced chronic interstitial nephritis.

94. IBID. *Anomaly,* rudimentary kidney, right side. *Ureter* on right side thickened; lumen obliterated. *Genital organs* normal. *Remarks:* Right kidney atrophic, weight one ounce, embedded in a mass of adipose tissue, contained four cavities filled with pultaceous matter. Left kidney showed compensatory hypertrophy.

95. IBID. *Anomaly,* hypertrophy of one kidney, left side. *Ureter,* renal vessels and *genital organs* normal. *Remarks:* Right kidney normal. Left kidney normal, but weighed 10¾ ounces.

96. IBID. *Anomaly,* horseshoe kidney. *Genital organs* normal. *Remarks:* Fused organs united by their *lower*

poles by an isthmus of fibrous tissue, *concavity superior;* lay at the level of the aortic bifurcation. Renal form well preserved.

97. IBID. *Anomaly*, horseshoe kidney. Renal vessels anomalous. *Genital organs* normal. *Remarks:* Fused organs united by their *lower* poles, with their *concavity superior;* pelves malformed; lobulation.

98. IBID. *Anomaly*, horseshoe kidney. *Ureters* deformed. Renal vessels anomalous. *Genital organs* normal. *Remarks:* Complete incorporation of the two organs united by their *lower* poles, with their *concavity superior*. Lobulation of both segments.

99. IBID. *Anomaly*, sigmoid kidney, left side. Right (upper) *ureter* entered right angle of trigone; left (lower) ureter at left angle. *Remarks:* Complete fusion of the two organs; upper hilum presented antero-internally; lower hilum faced anteriorly. The mass lay in the right lumbar region.

100. IBID. *Anomaly*, disc-shaped kidney. Lower *ureter* faced to the right of the trigone, upper ureter to the left. *Remarks:* Hilum faced anteriorly and antero-internally; two distinct pelves, one above the other.

101. D'OELSNITZ and ROULLIER (Bull. et Mém. Soc. Anat. de Paris, 1903, 6 s., v, 540). *Anomaly*, ectopic kidney, right side, young male adult. *Ureter* normal. Renal vessels on right side double, the arteries coming from the aorta. *Genital organs* normal. Cause of death, tuberculous meningitis. *Remarks:* Left kidney normal. Right kidney situated in the median line at the aortic bifurcation, with its convexity posterior.

102. ORTH, O. (Zent. f. Gynäk., 1905, xxix, 7). *Anomaly*, pelvic kidney, left side, female, age 30. Left *ureter* short, but otherwise normal. *Genital organs* normal. *Remarks:* Left kidney fixed to left pelvic wall; cross-shaped.

103. PAPIN (E.) and IGLESIAS (A. P.) (Ann. des Mal. d. Org. Gen.-ur., Paris, 1909, i, 424). *Anomaly*, horseshoe kidney, female, age 76. *Remarks:* Fused organs joined by their *lower* poles by a large band of glandular tissue, their *concavity superior*. Left kidney contained a calculus.

104. PHILLIPS, N. R. (Brit. Med. Jour., Feb. 21, 1903, i, 426). *Anomaly*, horseshoe kidney, male, age 41. Cause of death, obstruction of the bowels. *Remarks:* Fused organs united by their *lower* poles, with their *concavity superior*; a little lower than normal; renal calculus.

105. PLAY and FAROY (Bull. et Mém. Soc. Anat. de Paris, 1909, lxxxiv, 339). *Anomaly*, rudimentary kidney, left side, male, age 48. *Genital organs* normal. Cause of death, alcoholic Bright's disease. *Remarks:* Right kidney hypertrophied, weight 350 grams. Left kidney small, consistency of rubber, weight 50 grams, irregular in form, having six principal lobes, length 6 cm., width 5 cm. below and 2 cm. above, thickness 18 mm.; showed fibrous hyperplasia.

106. POHLMAN, A. G. (Indiana Med. Jour., vol. xxiii, No. vi, 216, Dec., 1904). *Anomaly*, disc-shaped kidney, male, age one year. *Ureters* emerged ventrally, that on the right side in front of the kidney, formed by an upper and a lower branch. The left ureter wound around the lateral margin of the left kidney almost horizontally, then turned down behind the kidney. Renal arteries four in number, one for the left kidney from the aorta, and three for the right kidney (two from the aorta and one from the right common iliac). *Genital organs* normal. Cause of death, pneumonia. *Remarks:* Fused organs lay on the bodies of the fourth and fifth lumbar vertebræ, just above the pelvic brim, in the median line. The mass was convex ventrally, roughly flattened, and quadrilateral. Capsule common to both kidneys. Right kidney caudate with vena cava at its inner side; fissured longitudinally, the fissure representing the hilum. Left kidney lay upon the right kidney; was more quadrilateral in form; covered the aortic bifurcation and the vena cava; its hilum was ventral. *Adrenals* normal in size and position.

107. PORTER, C. B. (Boston M. and S. Jour., April 2, 1903, cxlviii, 367). *Anomaly*, horseshoe kidney, female, age 31. *Genital organs* normal. *Remarks:* Fused organ joined by their *lower* poles, with their *concavity superior*, rested in the epigastrium.

108. POUSSON, A. (Ass. franç. d. urol.-Proc.-verb., 1908, Paris, xii, 273). *Anomaly* of the vessels, left side, male, age 46. *Ureters* normal. Renal vessels anomalous. *Genital organs* normal.

109. POYNDER, G. L. (Jour. of the Royal Army Medical Corps, 1908, xi, 606). *Anomaly*, horseshoe kidney, male, age 27. *Ureters* normal. *Genital organs* normal. Cause of death, Bright's disease. *Remarks:* Fused organs lay in front of lumbar spine, united by their *lower* poles, with their *concavity superior*.

110. RENDU, R. (Lyon méd., 1908, cx, 1040). *Anomaly*, absence of one kidney, left side, male, age 17 months. Left *ureter* and renal vessels absent. *Genital organs* normal. Cause of death, broncho-pneumonia. *Remarks:* Left kidney absent; left *adrenal* present. Right kidney globular, normally situated.

111. SCHMIDT, E. (Beitrag. z. path. Anat. u. z. allg. Path., 1907, xlii, 516). *Anomaly*, absence of one kidney, right side, male, age 64. Right *ureter* and renal vessels absent. Left renal artery from the superior mesenteric. *Genital organs* normal. Cause of death, cardiac insufficiency. *Remarks:* Right kidney absent. Left kidney hypertrophied. Right *adrenal* lay on right side of vena cava.

112. IBID. *Anomaly*, rudimentary kidney, left side, male, age 48. Left *ureter* absent. Left *genital organs* atrophic. Cause of death, tuberculosis. *Remarks:* Right kidney much enlarged. Left kidney atrophic, length 4 cm., breadth 1½ cm., situated to the left of the vena cava slightly above the aortic bifurcation.

113. IBID. *Anomaly*, rudimentary kidney, left side male, age 76. Left *ureter* absent. *Genital organs* normal. Cause of death, carcinoma of the stomach. *Remarks:* Right kidney greatly hypertrophied. Left kidney 4 cm. long, 3 cm. broad, in normal position.

114. VEROCAY, J. (Prag. med. Woch., Dec. 5, 1907, xxxii, No. 49, 637). *Anomaly*, disc-shaped kidney, right side, male, age 47. Three renal arteries (two from the aorta, one from the median sacral). *Genital organs* absent on the right side. Skeletal deformities. *Remarks:* Left kidney normally situated. Right kidney fused to the left; mass 17 cm. long, 9 cm. broad, 4.7 cm. thick. Right kidney and *adrenal* absent from normal site. Left *adrenal* normal. Mass showed two pelves and was situated near the pelvic brim.

115. VOISIN (R.) and GALIPPE (J.) (Bull. et Mém. Soc. Anat. de Paris, 1903, 6 s., v, 508). *Anomaly*, horseshoe kidney, male, age 46. Pelves of *ureters* situated in *front* instead of behind the vessels. The ureters cross anterior face of the horseshoe. One large renal artery from the left common iliac, dividing beneath the point of fusion into two branches, one for each kidney. *Genital organs* normal. Cause of death, alcoholic pneumonia. *Remarks:* Fused organs joined by their *lower* poles, with their *concavity superior*, rested at level of origin of the two common iliacs. Left kidney larger, normally situated. Right kidney lying obliquely from right to left across the vertebral column, its left lateral face fused with the inferior pole of the left kidney.

116. WARD, B. J. (Brit. Med. Jour., April 25, 1908, i, 978). *Anomaly*, absence of one kidney, right side, male, age 30. Right *ureter* absent. Only one opening into the bladder. Left renal vessels enlarged. *Genital organs* normal. Cause of death, chronic mitral disease. *Remarks:* Right kidney absent. Left kidney twice its normal size, weight 12 ounces, in normal position.

117. WEIBEL, W. (Wien. Klin. Woch., 1908, xxi, 1632). *Anomaly*, sigmoid kidney, left side, female, age 35. *Genital organs* normal. *Remarks:* Right kidney in normal position; left kidney attached to its under surface. Hilum of right kidney faced the median line; that of the left kidney in opposite direction. Left kidney lay at the level of the right sacro-iliac synchondrosis. The lower (left) kidney was extirpated.

118. WHITE, F. (Trans. Path. Soc. of Phila., 1898, xviii, 326). *Anomaly* of form, left side, boy. *Ureters* three in number, two from the left kidney, each nine inches long, uniting one inch from the bladder. *Genital organs* normal. Cause of death, carbuncle. *Remarks:* Right kidney normal. Left kidney lobulated; two hila. Other congenital anomalies — double great toe, webbed toes, supernumerary finger.

119. WIGLESWORTH, J. (Liverpool Med.-Chir. Jour., 1903, xxiii, 399). *Anomaly*, horseshoe kidney, female, age 23. *Ureters* normal. Two right renal arteries from the aorta, one left renal artery; the bridge received a small artery from the aorta. *Genital organs* normal. Cause of death, brain disease. *Remarks:* Kidneys of usual size united by their *lower* poles by a broad band of renal tissue, with their *concavity superior*. The bridge lay in front of the abdominal aorta and vena cava opposite the second and third lumbar vertebræ. *Adrenals* were present. The hila pointed anteriorly. Weight of the kidney, 249 grams.

120. WILSON, E. M. (Brit. Med. Jour., July 11, 1903, ii, 120). *Anomaly*, horseshoe kidney, female, age over 50. Deformity of uterus present. *Remarks:* Horseshoe kidney of large size, united by the *lower* poles, with the *concavity superior*.

121. WINTER, G. G. (Arch. f. klin. Chir., Berlin, 1903, lxix, 611). *Anomaly*, absence of one kidney, left side, male, age 21. Left *ureter* only 8 cm. long; *two openings* into the bladder. *Genital organs* normal. Cause of death, uremia five days after nephrectomy. *Remarks:* Left kidney absent; right kidney congenitally cystic; extirpated.

122. WINTERNITZ, M. C. (Johns Hopkins Hosp. Bull., Aug., 1908, xix, 229). *Anomaly*, sigmoid kidney, right side, male, age 5 months. *Ureters* normal. Renal vessels and *genital organs* normal. Cause of death, enterocolitis. *Remarks:* Kidney subperitoneal on the spinal column at the level of the fourth and fifth lumbar vertebræ covering and extending below the aortic bifurcation. Left kidney in normal position; its hilum faced the spinal column. The lower hilum (right kidney) was directed anteriorly. Right *adrenal* absent. Left *adrenal* normal. Right kidney absent from its normal position.

123. ZAUFAL (Prag. med. Woch., No. 24, June 16, 1898, 305). *Anomaly* of form, both sides, male, age ¼ hour, an eight months' fœtus. *Genital organs* normal. Cause of death, inanition. *Remarks:* Body of child 40 cm. long; weight 1600 grams. Right kidney cross-shaped, left kidney elliptical; both organs lay at their normal height.

RECENT DEVELOPMENTS IN RENAL EMBRYOLOGY

While it is to be regretted that nothing definite is known concerning the ultimate causation of kidney defects and the commonly associated anomalies of the lower spermatic tract, much that is strongly suggestive, etiologically, has been evolved in the recent developments along the line of renal embryology. The exhaustive and deeply scientific labors of such workers as E. C. Hill and Pohlman (30), of Johns Hopkins Hospital, in this country, and Papin and Iglesias (28), of France, with other investigators abroad, have contributed largely to our knowledge of this subject.

It is now well established that the renal buds—the embryonic tissue that ultimately forms the true kidney, or metanephros, and which at this stage of embryonic evolution is known as the "metanephrogenous tissue"—develop early. In the human embryo of 5 mm. they are given off by the Wolffian duct and lie upon the dorsal wall of the somatic cavity just anterior to the second sacral vertebra and immediately below the Wolffian body—so close, indeed, that the cephalic extremity of the true kidney impinges upon the last canaliculus of that body. The caudal extremity of the metanephrogenous tissue is free, and there is no intermediary organ between the two cellular masses that are ultimately destined to form the two kidneys. In the embryo of 6 mm., the Wolffian duct sends off another, or dorsal, outgrowth which ascends towards the tissue of the metanephros and about the fifth week divides into two large calyces which form the renal pelvis, the lower constricted portion constituting the primitive ureter. In an embryo of 10 mm. the two kidneys have assumed their characteristic bean shape with their upper borders at the brim of the pelvis. The two organs lie parallel to each other with the primitive pelves ventrad and the metanephros dorsad, and in an embryo of from 4 to 5 weeks have reached the level of the aortic bifurcation. At the end of the fifth week (an embryo of 14 mm.) the upward movement of the kidneys is accompanied by a movement of axial rotation which brings the hila (that up to this time have been directed ventrally) toward the median line, while the large calyces lie in front with the metanephros resting between them. The upper borders of the

kidneys have now reached the mid-lumbar region. At the eighth week the upper poles of the kidneys lie at the first lumbar vertebra, while the inferior poles touch the fourth vertebra; and finally, toward the ninth week, the kidneys attain their normal height in front of the last dorsal and two upper lumbar vertebræ, the embryo now measuring from 25 to 30 mm. in length. The axial rotation of the ureteral expansion should be accomplished between the fifth and eighth weeks of intrauterine life. It is also now known, through the investigations of Hill and Castellani, that the true kidney does not receive its vascularization until it has reached the situation in the body which it should occupy in the adult—as may be inferred from the fact that the renal artery is normally given off at a right angle to the aorta.

From the foregoing statements it becomes obligatory to conclude that all the multifarious malformations of the kidney must arise from some irregularity in the time of appearance or ultimate development of the renal buds, and that, therefore, these defects are of early origin in the life history of the embryo. It must remain true, also, that the low position assumed by the anomalous organ in almost every instance can be explained only in the same manner, the defect appearing before the normal rising process has been accomplished, that is, prior to the end of the eighth week. The earlier the developmental defect appears, therefore, or the later the corresponding renal bud is thrown off, the lower must be the position of the deformed organ in the pelvic or abdominal cavity. The old theory of ptosis in explanation of this low position is, accordingly, no longer tenable. The descent is not a secondary event, as this theory must assume. Here we have at once a strong point of distinction between the congenital cases of dystopia and "floating kidneys" due to postnatal disease.

In the light of this most modern theory—which appears to be sustained by the steps of embryonic development—congenital absence of a kidney must be due to a failure on the part of the Wolffian duct to throw off the corresponding renal bud after the duct has reached the cloaca. Should the duct fail to reach the cloaca and also to throw off the renal bud, there will then occur a conjoined absence of the kidney and the sex-gland of that side. If one renal bud is thrown off at an appreciable interval of time subsequent to the birth of its fellow, the kidney on that side will be congenitally lower. If the renal buds lie too closely together, in a cramped position, there might occur a fusion of the masses of mesenchyme with a resultant horseshoe kidney, or an organ showing other degrees of union. If the sprouts of the renal buds are each surrounded by an independent mass of mesenchyme, two distinct kidneys on one side might result, and the supernumerary kidney may be accounted for in this way. If the buds do not grow dorsally, but emerge on the lateral or anterior aspect of the Wolffian duct, some very unusual form of dystopia might result. The curious anterior position of the mural kidney, as seen in my own case and that described by Newman (25) may be explained in this manner, or by a sweeping forward of the metanephrogenous tissue of the affected side in association with the anterior curving of the lateral wall of the somatic cavity, which unites with its fellow in the anterior median line of the body at about the fourth or fifth week of embryonal existence.

It is likewise true that the abnormality in vascularization that is commonly present under these circumstances results secondarily, and entirely because of the primary defect in the renal body. The vascularization of the kidney is altogether dependent upon the position of the kidney in the body cavity. Thus, a renal bud which has been slow in its rise will receive its artery from a lower point on the aorta than it should, as from the mesenterics, the iliacs, or even the middle sacral artery. This abnormal vascularization will still further hold the dystopic kidney in its abnormally low position.

ASSOCIATED ANOMALIES OF THE LOWER SPERMATIC TRACT

Not infrequently malformations of other organs, as the rectum, bladder, uterus, vagina, ovaries, and lower spermatic tract generally, accompany congenital defects of the kidney, as do also certain deviations from the

normal in the position of the large intestine and peritoneum. This is not to be wondered at when the intimate embryonic relationship of these parts is recalled. The female genitalia seem to be especially prone to these developmental defects, which are almost invariably found on the side of the renal anomaly. The statistics vary remarkably in this respect in the compilations of renal anomalies that are accessible. For instance, in 76, or 33 per cent, of the 226 cases collected by Moore (22) there were noted more or less extensive defects of the genital organs, in most instances amounting to a complete unilateral uro-genital agenesis; while in but 9 of the 123 cases I have collected are defective genitalia recorded.

A NEW CLASSIFICATION OF CONGENITAL ANOMALIES OF THE KIDNEY

My investigation of this subject has convinced me that the classifications of anomalies of the kidney which have been suggested from time to time are deficient in several respects. After carefully weighing the matter from an embryologic standpoint, the deformities of the kidney seem to best group themselves according to a scheme which may be expressed as follows:

I. Variations in form and size.
   1. Lobulation.
   2. Hypertrophy of one kidney.
   3. Atrophy of one kidney (rudimentary kidney).

II. Variations in number.
   1. Absence of both kidneys.
   2. Absence of one kidney (single, solitary, unilateral, or unsymmetric kidney).
   3. Presence of more than two kidneys (supernumerary kidney).

III. Variations in location (dystopic or ectopic kidney).
   1. Right- or left-sided double kidney (non-fused).
   2. Mural kidney.
   3. Pelvic kidney.

IV. Fusion of the kidneys.
   1. Horseshoe kidney.
   2. Sigmoid kidney.
   3. Disc-shaped or placentoid kidney.

V. Variations in the pelvis, ureter, and blood-vessels.

This tabulation differs from that suggested by Newman (27), primarily in that "single" or "solitary" kidney—in which there is a total agenesis of the organ and its appendages on one side—is considered as quite distinct from the rudimentary or atrophic kidney—in which vestiges of the organ are to be found; and, in the second place, in the introduction of the entire class of ectopic kidneys as a distinct group of anomalies.

ALTERATIONS IN THE FORM AND SIZE OF THE KIDNEY

The kidney may vary remarkably from the normal in outline and size[1] without any material effect upon the total quantity of renal tissue present or upon its functionating power. At times it may be elongated so as to assume a sausage-shape; it may be increased in thickness and become globular in outline, closely resembling the normal fœtal type of kidney. Occasionally it assumes a shape that leaves no resemblance whatever to the normal organ. Thus, it may occur as a quadrilateral mass; and in a very few instances it has been known to take on a discoid form, without fusion with its fellow, as in the remarkable case recorded by Fetterolf (8), of Philadelphia. The kidney is often unduly small, and is then generally deeply lobulated, retaining in this respect the normal fœtal condition, which should disappear by the close of the first year of infantile life. It is interesting to note that lobulation of the kidney is more frequent and more pronounced in the presence of some associated abnormal condition, as renal dystopia, atypical distribution of the vessels, or malformation of the other genito-urinary organs. The fissuring is then, as a rule, more marked on the anterior than on the posterior aspect of the organ. It exerts no deleterious effect.

HYPERTROPHY OF ONE KIDNEY

Hypertrophy of one kidney may exist in association with a normal organ upon the opposite side; but the condition is generally

[1] The normal kidney measures 4 inches in length, 2½ inches in breadth, and 1¼ inches in thickness, and has, according to Sappey, an average weight of 165 to 170 grams. The left kidney is generally longer narrower, and thinner than the right.

compensatory in nature, the other kidney being congenitally absent or the subject of marked atrophy. When hypertrophy exists in the presence of a functionating kidney on the opposite side, the increase in size is usually due to a true hyperplasia of renal tissue. The individual is, therefore, more generously supplied with kidney tissue than the average person, and is proportionately benefited by this freak of nature.

APLASIA OF ONE KIDNEY

The atrophic or rudimentary kidney may be readily recognized by the presence of a ureter, which participates more or less completely in the atrophic process, and by the presence of a system of vascularization which may be, and generally is, anomalous. This must be regarded as a condition quite distinct from a congenital absence of one kidney, in which condition the ureter and renal vascularization are also totally absent, and in which there is frequently an associated defect in the lower spermatic tract. Atrophy of one organ is always associated with a compensatory enlargement of its fellow.

AGENESIS OF BOTH KIDNEYS

Total absence of renal tissue was formerly believed to occur only in the lower grades of fœtal teratism (Chaussier, Pigné, Ahlfeld, and others), but the remarkable case recorded by Hauch (12) in 1908, disproves such an assumption. This observer records the case of a infant 48 cm. in length and weighing 2200 grams (about the size of an eight months' fœtus) which was born alive and lived for three-quarters of an hour, at the expiration of which time it succumbed in a deeply cyanosed condition. The autopsy revealed a total absence of both kidneys—no trace of renal tissue was to be found. There was an associated oligohydramnios and a left pes valgo-planus. Had it not been for the carefulness of the observation the question of obscure renal dystopia would arise. Béclard claims that total renal agenesis is most frequently encountered in acephalous monsters, and McCrae (16) states that it is generally associated with abnormalities of the sexual organs. Such a condition must be due to a failure on the part of both Wolffian ducts to throw off their renal buds. These cases are extremely interesting from a physiologic point of view as illustrating that the most important functions of life may be preserved *in utero* in the absence of renal tissue.

THE SOLITARY KIDNEY

Agenesis of one kidney, resulting in the condition known as single or solitary kidney, is not so common as is generally believed. In 25,142 autopsy records published by Morris (24), Petersen (29), Rootes (34), Sangalli (35), and Menzies (20), there were found but 11 cases of solitary kidney, giving an average of 1 case in 2,286. This closely approximates the estimate of Moore (22) of 1 case in 2,400, and of Gérard (9) of 1 in 2,500 autopsies. The estimate of Weir (37), of New York, of 1 case in 5,000 autopsies is probably too low. As to the relative frequency of the anomaly, it stands second in the list, being exceeded only by the horseshoe kidney.

The anomaly was recognized by many of the older writers, including Duretus, Vesalius, and Eustachius, but Morgagni, in 1769, was the first author to attempt a classification. He erroneously included fusion of the kidneys under this head, and applied to the common group the term "solitary" kidney. Newman (27) also erroneously, I think, included here all instances of atrophic or rudimentary kidney.

From the embryologic point of view it is much better to embrace under this class only those cases in which one active organ is present with congenital absence of its fellow, no trace of the kidney, ureter, or blood-vessels being found. In almost all these cases there is but one ureteral opening into the bladder, giving the base of that organ a curious lop-sided appearance which is quite characteristic under the cystoscope. Unfortunately, in very rare instances of unilateral renal agenesis both ureteral openings persist in the vesical trigone, thereby depriving us of a positive diagnostic point.

Ballowitz (1) collected 213 cases of congenital absence of one kidney; Mankiewicz (18) added 21 cases; Cadoré (4), 44 cases; and Cathelin (6), 22 new cases, giving a total to

that date (1909) of 300 authentic cases. Their conclusions were as follows: Such deficiency occurs almost twice as often in males as in females. (In my own table there are 19 males to 3 females, the sex not being mentioned in two instances.) Roberts (32), gives the proportion as 4 males to 1 female.

The deficiency is more common on the left side, but while in males the left kidney is far more commonly absent, in females the two sides show the defect equally. [In my table the right side was affected 13 times and the left only 11 times. In Moore's (22) 226 cases there were 120 males to 71 females. Of the males 76 showed the defect on the left side and 44 on the right, while in the females there were 31 with left-sided defect and 35 with right-sided agenesis.] Le Conte (13), in 1908, reported 32 cases, with left-sided deficiency in 17 cases and right-sided deficiency in 11 cases, in 4 instances the side not being indicated. The renal vessels are generally absent, and also the ureter, on the abnormal side. The bladder, except for absence of one ureteral opening, is generally normal. Commonly there is a compensatory hypertrophy of the single kidney, but not always so. This hypertrophy is in reality a hyperplasia, the abnormal bulk being in great measure, if not entirely, due to an increase in the cortex of the organ, while the renal calyces and the medullary pyramids preserve their normal relations both in number and size, Moore (23). The single kidney is almost always normal in shape and position, but may be found in the iliac fossa, in the pelvis, or in the median line on the sacrum, Robinson (33). In a considerable percentage of the cases there are found associated deformities of the organs of generation, especially in the female, and almost invariably on the side of the renal defect. These genital defects especially involve the conducting, rather than the glandular, portion; that is, the uterus, vagina, Fallopian tubes, vas deferens and vesiculæ seminales, rather than the ovaries and testes. It is interesting to note that congenital absence of a kidney has been recorded in the horse, sheep, rabbit, hen, and pigeon.

THE ADRENAL IN SOLITARY KIDNEY

The adrenal generally exists even in the absence of the kidney, but is commonly misplaced, often deformed, and undoubtedly in a few instances may not be present. It was absent in my own case reported this evening. In 31 of Ballowitz' (1) cases it was missing, while Brumer (3) states that in 48 cases of single kidney which he had collected the adrenal was absent in only 5 instances. In my table absence of the adrenal is recorded but 5 times. Liebmann (14) reports a case of single pelvic kidney with two adrenal bodies.

SUPERNUMERARY KIDNEY

Supernumerary kidney is exceedingly rare. It results from extreme segmentation of one of the kidneys with independent development of the renal sprouts. In its most typical form it lies in serial order with the kidney of its own side, but is entirely distinct, with its own vessels and ureter. The latter may or may not fuse with that of the other kidney of the same side, but generally does so. The additional kidney may lie in front of or on one side of the vertebral column, or in the pelvic cavity.

CONGENITAL DYSTOPIA OF THE KIDNEY

Congenital dystopia of the kidney is much more common than congenital one-sided kidney defect. No organs in the body vary more in their position than do the kidneys, both in their relative distance from the spine and in their relation to other organs; malposition within certain slight limits is, therefore, of frequent occurrence, but is absolutely harmless. Congenital dislocation rarely affects both kidneys except where fusion has occurred; it is much more common upon the left side and in men than in women, according to Stern (36) in the proportion of 20 to 9. The displaced organ is always depressed and is generally fixed at some point on the posterior wall of the abdominal cavity, McCrae (16), with its long axis vertical or slightly oblique. Very rarely it occupies a transverse position, Carslaw (5), and displacements anteriorly are exceedingly rare, Guinard (11). Quite frequently abnormalities of the intestines and sexual organs are associated. Embryological-

ly this anomaly results from a late throwing off of the renal bud on the affected side.

RIGHT- OR LEFT-SIDED DOUBLE KIDNEY (NON-FUSED)

A very rare form of renal dystopia is that in which the two organs, quite distinct, lie upon one side of the vertebral column. Mennacher (19) has searched the literature and has found but 5 cases of this anomaly in which both kidneys lay on the right side and 4 cases in which they both lay on the left side. My table is unusually rich in this dystopia, no less than 4 cases being included, three of them being right-sided. Such a malformation must arise from an internal lateral giving off of the renal bud from the Wolffian duct of the deficient side.

MURAL KIDNEY

Mural kidney is the rarest of renal anomalies. I have been able to find but two cases recorded in all medical literature. In addition to my own case reported this evening, Newman (26) describes a fixed displacement of the right kidney in a man, the ectopic organ resting in the anterior abdominal wall above Poupart's ligament, where it simulated a perityphlitic abscess. McArthur's (15) case of pelvic kidney, in which the organ rested in the anterior median line of the body immediately behind the symphysis pubis, barely escaped being a member of this rare group of renal anomalies. The mural kidney must result from an anterior or external lateral position of the renal bud coming from the Wolffian duct of the affected side.

THE PELVIC KIDNEY

That form of renal dystopia in which the displaced organ is lodged within the pelvis is known as the "pelvic kidney." Most frequently the kidney rests on the edge of the pelvis, obliquely across the sacro-iliac synchondrosis, or across the sacral promontory. In some cases the organ is fixed behind the uterus, or lies transversely between the rectum and bladder. The condition is much more common on the left side. Cragin (7), in 1898, stated that of 40 cases of congenital pelvic kidney found in the literature up to the year 1869, in 35 instances the left organ was ectopic. Of 15 cases found by Cragin since 1869, 14 were left-sided defects. Up to 1905 Gérard (9) had collected 74 cases of pelvic kidney; and my own table includes 9 cases, 7 of which were left-sided displacements. The frequency of the anomaly is about 1 in 1,000 autopsies. Morris (24) found in 8,800 autopsies performed at Middlesex and Guy's Hospitals but 10 congenital pelvic kidneys. Because of the situation of the ectopic organ in the superior pelvic strait it may give rise to serious interference with labor, as in the case reported by Cragin (7.) The arterial supply of the pelvic kidney comes, as a rule, from one of the common iliac arteries, or occasionally from the aorta just above its bifurcation.

FUSION OF THE KIDNEYS

Fusion of the kidneys results from a cramping or crowding together of the renal buds shortly after their appearance, the masses of mesenchyme becoming more or less blended. The amount of fusion that takes place varies greatly, from the simplest degree in which a thin, flat isthums of connective tissue joins the lower poles of the kidneys across the vertebral column, up to the more pronounced fusion in which there is a complete incorporation of the kidneys to form one disc-shaped organ in the median line of the body, or an elongated body to one side or the other of the spine. The common characteristic of the fused kidneys is the presence of two ureters. Monquiot (21) records a remarkable case of fusion in which a kidney lying transversely across the lumbar vertebræ presented 4 pelves, 4 ureters, and as many arteries and veins; and Morris (24) reports an instance of fused kidney in which the hilum of one organ was placed against the outer convex aspect of the other kidney.

HORSESHOE KIDNEY

The horseshoe kidney represents the commonest form of fusion. According to Morris (24), there were 19 cases in 18,244 autopsies, or not quite 1 case in 1,000. As usually encountered, the two organs are joined at their lower extremities and lie with the

concavity directed upward. The connecting bridge may consist of a simple band of connective tissue, or there may be a fusion of the true renal substance with more or less distortion of the renal form of the two lateral segments. Frequently the kidneys are lobulated, and there is associated deformity of the pelves and ureters, and anomalous distribution of the blood-vessels.

As a rule, the fused organs rest low down on the vertebral column with the isthmus crossing the spine about the level of the aortic bifurcation; occasionally they lie as low as the pelvis, and often in the iliac fossæ. The hilum is generally directed anteriorly with the ureters invariably passing toward the isthmus. The connecting bridge is almost always at the lower extremities of the kidneys, with the concavity of the horseshoe directed upward. There have been cases recorded, however, in which this condition was reversed, the kidneys being united above with the concavity directed downward. According to Papin and Iglesias (28) the fused organ lies lower in the abdomen when this reversal exists. Gérard (9), in 1905, was able to find but 7 cases in literature in which the superior poles of the kidneys were united. My table shows but two instances of union above, namely, Caverly's case and the anomaly I record to-night through the courtesy of Dr. O'Connor. It is interesting to note that Beel (2) has recently found a horseshoe kidney in a calf.

SIGMOID KIDNEY—CROSSED DYSTOPIA

The so-called "sigmoid kidney" is an end-to-end fusion of the two organs, both kidneys occupying one side of the body. While unilateral, however, it is not a "solitary kidney." This anomaly must be regarded as intermediate between the horseshoe and the disc-shaped kidneys. The transposed kidney is usually fused to the lower or inner portion of the opposite organ. According to M'Murrich (17) in 60 per cent of the cases the right kidney is displaced, the sigmoid body lying on the left side of the body. In my table 8 cases of sigmoid kidney are included, in 5 of which the fused organ lay on the right side of the body. Usually the hila are both anterior, but occasionally one hilum lies in a normal position while the other—usually that of the crossed kidney—is on the anterior surface of the organ.

Pohlman (31) explains the development of crossed dystopia as follows: As a result of some unknown cause the dystopic kidney has developed more slowly than its fellow. This may be due either to a slower growth of the dystopic bud or to a later date of its appearance. As a consequence, the normal kidney reaches its proper position and usually rotates normally, while the deformed kidney is lower in position and has not rotated. In this position the two renal buds come in contact and fuse, the upper pole of the deformed kidney uniting with the lower pole of its fellow. Further rotation or ascent then becomes inpossible.

In the majority of cases of sigmoid kidney thus far reported the adrenal has occupied its normal position on the ectopic side, though it may be somewhat misshapen. Occasionally it is misplaced.

DISC-SHAPED OR PLACENTOID KIDNEY

(*ren concretus, ren impar dexter vel sinister*)

The "disc-shaped kidney" is the term applied to those instances of fusion in which the incorporation of the two organs is very complete. The rounded mass frequently lies in the median line of the body over the lumbar vertebræ. There are two pelves and ureters and always an anomalous vascularization. Gérard (9), in his compilation of 527 cases, quotes 8 instances of disc-shaped kidney lying in front of the vertebral column and 14 cases lying to one or the other side of the spine. Four of the cases included in my table have been reported since Gérard's paper was written. Three of these lay to one side of the spine, and one was situated on the median line over the spinal column.

MINOR VARIATIONS FROM THE NORMAL

Malformation of the renal pelvis and of the ureter is fairly common, but is generally of slight importance. The ureter may be double for a short distance in the upper portion, and in rare instances this duplication has persisted

throughout its entire course, as in a case reported by Dr. George H. Chambers, some years since before the Pathological Society of Philadelphia. Molinetti mentions six ureters in one person, and Coëyne and Morestin mention duplication of the ureters on both sides. "The ureters sometimes have anomalous terminations, either in the rectum, vagina, or directly in the urethra. Flajani speaks of the termination of the ureters in the pelvis." I have had a similar case which it is my intention to publish at some early opportunity. "Nebel has seen them appear just beneath the umbilicus. Lieutaud describes a man whose ureters, as large as intestines, terminated in the urethral canal, causing him to urinate frequently. The bladder was absent." (Gould and Pyle (10).

No abdominal arteries are more irregular in their distribution than are those which supply the kidneys. They may vary in their number, origin, or mode of entrance into the kidney. They may arise from the common iliacs or their branches, or from the suprarenal, mesenteric, hepatic, or middle sacral arteries. They may enter the kidney at the hilum or at any point upon the renal surface. Most commonly anomalous vessels are found at the upper extremity of the kidney. The veins share in the frequency of anomalous distribution.

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THE SIGMOID IN ITS RELATION TO PELVIC DISEASE[1]

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FOLLOWING the pioneer work of McDowell, Sims, and others, the concentrated specialization upon diseases of the generative organs of women has given us a fairly well understood living pathology, to which end this Society has contributed its quota. The long interval existing however between McDowell's ovariotomy during the first decade of the nineteenth century and Fitz's classical work on appendicitis close to the last decade of the same, notwithstanding the extensive pelvic work of Sims, the Atlees, Martin, Winter, Olshausen, Battey, Lawson Tait and scores of others, and notwithstanding also the close anatomic and pathologic relationship which exists between the appendix and pelvic organs, indicates how closely their observations were confined to their specialty. This failure to note immediate and related pathology was no doubt in part due to the more or less effectual walling off of the supposed affected area. How completely a pathologic condition can be shut off from the field of operation is shown by a related experience of a surgeon of good repute of this city. He performed a laparotomy for supposed fibroid tumor, but after thorough packing off of the intestines found no fibroid. Lesser pathologic conditions were given attention and the abdomen was closed. A few days later a large mass was found in the left side of the abdomen, which upon observation from time to time was found at last to occupy the region of the supposed fibroid. The abdomen was again opened and a left ovarian tumor with a long pedicle was found. This is related as an illustration of the fact that conditions more intimate than the moderate or mild appendical affections can readily be overlooked. This is also shown in the pathology in varying degrees which exists in the sigmoid, and which may bear the relation to disease of other pelvic organs of either cause or effect. This pathology which is even more intimate than that of the appendix is only just beginning to receive the attention which it deserves, even in those cases in which operation makes close observation possible.

As we have well in mind the normal and pathologic variations of the internal genital organs it has seemed not unwise to recall these important variations in an organ so closely related as is the sigmoid, and to draw from the associated conditions such practical conclusions as is possible. First it seems an anatomical point of pathologic significance that we have crowded into the pelvis a portion of three tracts — viz.: nearly all of the genital tract and the terminal portions of the urinary and alimentary tract — the latter always teeming with bacteria, and the two former seriously infested frequently under pathologic conditions. Not only have we here a portion of these tracts but these portions are the reservoirs of convenience for the excreta of two of them, which gain pathologic significance as modes of dress and habits of life, to meet the requirements of civilization, force an increase in their dimensions by less frequent evacuation. The genital tract not only has its reservoir the uterus with its pathologic significance but the whole tract is made the hatchery for those bacteria which thrive upon man's unchecked polygamous tendencies. Having in mind the undesirable companions of the several pelvic organs which may so readily create the vicious pathologic circle let us turn our attention more particularly to the sigmoid.

The sigmoid is a variable loop of the large intestine lying between the rectum and decending colon and is usually considered the distal portion of the latter organ and is usually of the smaller diameter, although in this it has wide variation. While according to Treves, Robinson, Lusk and others the sigmoid frequently varies in length from ten to

[1] Read before the Chicago Gynecological Society, March 24, 1911. For discussion see p. 341.

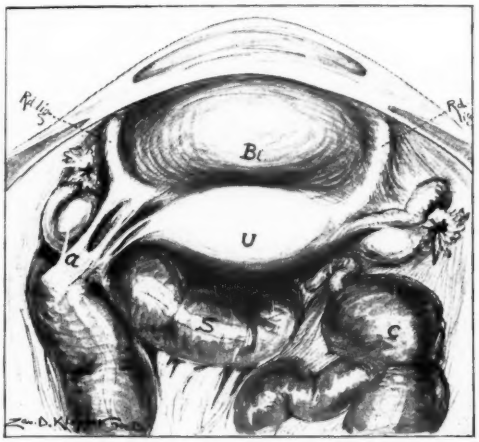


Fig. 1. a, adhesions from the sigmoid to the uterus, tube, ovary, and round ligament.

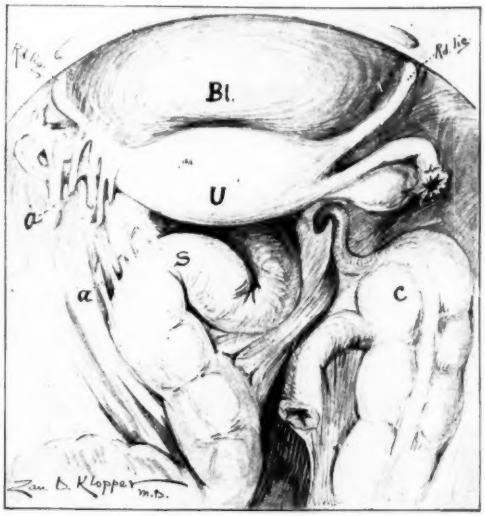


Fig. 2. a, adhesions severed, freeing a partially obstructed sigmoid.

eighteen inches and occasionally is much shorter or longer, Lusk recording one case as short as four inches and one as long as thirty inches, yet the terminals are arbitrary and therefore rather constant, the sigmoid beginning at the crest of the ilium and ending at the third sacral vertebra. It will be seen then, that if the sigmoid takes the shortest distance between these points it is necessarily limited and comes very little in contact with the internal genitalia. If however, the sigmoid takes a circuitous route between these points by reason of a wandering attachment or what is more common a long mesosigmoid the sigmoid may almost completely envelop the genital organs. In operative work the mesosigmoid has been found to vary from almost entire absence,— the peritoneum binding the sigmoid to the iliac fossa — to a long pendulous structure allowing the sigmoid to prolapse into the pelvis, and it has been known to invert into the rectum or wander to other parts of the abdomen. There is almost no pelvic or abdominal structure to which the sigmoid has not been found adherent. We have then in the sigmoid a structure looped, kinked, sacculated, with congenital or acquired diverticuli, loaded with irritating excreta and swarming with bacteria within and subject to bacterial invasion from without. Add to the sacculations and roughened surfaces, the appendices epiploicæ with their fat and poor blood supply, and we are not surprised that we have here an organ rich in pathology; furnishing according to Treves 58 per cent of strictures of the intestinal tract; furnishing more carcinoma than any other portion of the large intestine except the rectum; furnishing ulcers simple, syphilitic, and tubercular; polypi malignant and benign; inflammatory thickening known as sigmoiditis, and, endo-, peri-, para- and mesosigmoiditis, and diverticulitis of Graser. Not only are these conditions of importance by reason of proximity to the pelvic organs but a full or thickened sigmoid interferes with the ureter and the blood and lymph currents as they pass behind this structure. As prolific, however, as is the sigmoid in producing pelvic disease, it seems indisputable that the genitalia are more often the seat of primary trouble which secondarily involves the sigmoid. The pressure of pus tubes, and the traction upon and kinking of the sigmoid by adhesions is well known. That the sigmoid may furnish a part of the wall of a pelvic abscess is a matter of common observation in which case the inflammatory reaction may consist of perisigmoiditis, myosigmoiditis with much thickening, or perfora-

Fig. 3. Sigmoid adherent to both right and left adnexa.

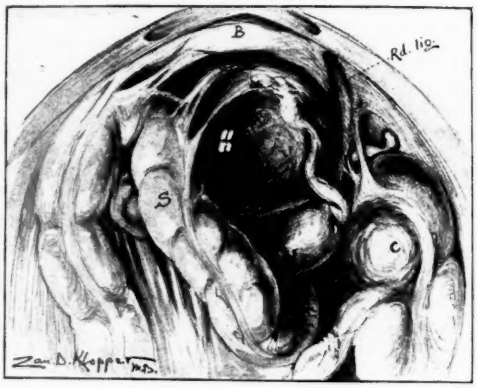


Fig. 4. Sigmoid adherent to right ovarian cyst and completely covering left tube and ovary.

tion may occur and while the infection from the genitalia may have been at fault primarily, yet after adhesions have taken place the colon bacillus may play an important part. Frequently do we note the colon bacillus odor in a pelvic abscess whose walls are composed partly of bowel whose coats are still intact. Not infrequently do we find pelvic masses composed of pus tubes and exudate ovarian growths, displacements of the uterus etc., causing such pressure as to interfere with the bowel action and causing distension of the bowel which is increased by efforts at defecation. The muscle fibers of the bowel in this way become stretched, thinned, and separated, allowing the bowel wall to sacculate or the mucous membrane to herniate through the musculature causing diverticuli which becoming infected and impacted with enteroliths results in the reaction known as diverticulitis.

Either the bowel with its carcinoma, benign stricture, ulceration, infections, kinkings, diverticuli, etc., or the genitalia with their numerous infections, enlargements, new growths, adhesions, displacements, etc., may furnish primary disease. Having once begun, however, the major trouble may be shifted to the neighboring organs. While recognizing the truth and value of some points made by Pennington in his paper before the Mississippi Valley Medical Association, we were inclined to the opinion that he presented a one-sided view of this interrelation of the disease of the pelvic organs, exaggerating the sigmoid as a primary focus and minimizing — I might almost say eliminating — the genitalia as a primary focus. My observation would lead me to the conclusion that while both are fairly common yet the genitalia are more frequently the seat of primary pathologic processes. However, it is quite possible that the nature of Dr. Pennington's work gives him opportunity to observe numerous cases in which the sigmoid is primarily responsible and it is also possible that my observations are likewise influenced.

The movable sigmoid may be classed with the omentum in its tendency to do police duty, but with far greater possibilities for harm. In the surrounding of a pelvic infection by the omentum and sigmoid the patient's life may be saved but the omentum is adherent and the sigmoid is crippled.

The more or less indurated, constricted sigmoid has been found adherent to the posterior cul-de-sac, to the rectum, to itself, to the pelvic wall, to the ovaries, to an ovarian tumor, to the tubes, to an extrauterine pregnancy sac, to the appendix, to the abdominal wall, the posterior surface of the uterus, the fundus of the uterus, the anterior surface, the posterior surface of the broad ligament, the anterior surface of broad ligament, the round ligament, the peritoneum at the inguinal ring,

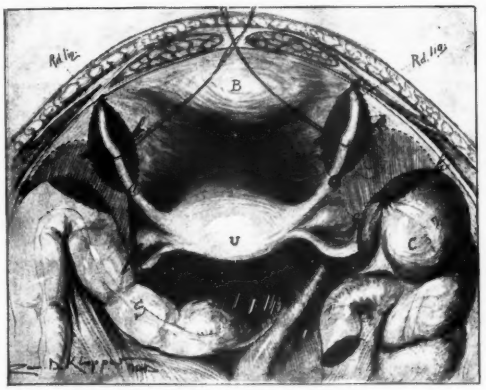


Fig. 5. a, b, c, d, areas of peritoneum that will be drawn into the abdominal wall by round ligament shortening. Curved dotted line (e–f) shows outline of adherent sigmoid, and g–h shows outline of adherent cecum and appendix falling within area to be drawn into abdominal wall.

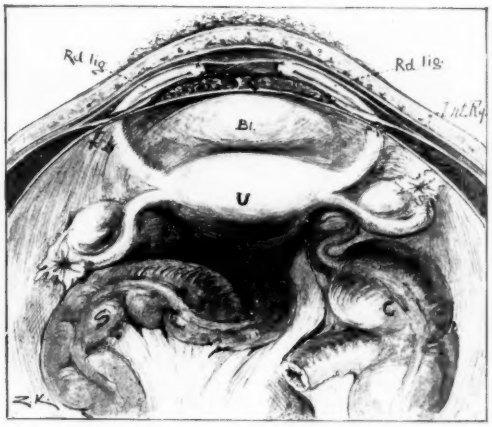


Fig. 6. Round ligaments shortened showing the necessity of rendering them free from adhesions.

to the uterovesical cul-de-sac, the fundus of the bladder, the pelvic blood-vessels, the ureter, etc. This union has been found varying from slight adhesion to firm union, from protective thickening to threatened or actual perforation. We have seen pus tubes perforate the peritoneum and penetrate the post recto sigmoidal connective tissue from each side. I have come to look for some degree of adhesion of the sigmoid in almost every case which presents pelvic disease and find it more frequently than we do adhesions around the appendix. Byron Robinson after extensive abdominal work in the live and dead subject says that there is scarcely an abdominal organ except the pancreas to which he has not seen the sigmoid attached.

We are questioning these patients who give a history of pelvic disease more closely regarding bowel symptoms, not infrequently have they passed mucus or blood and perhaps have had alternate attacks of diarrhœa and constipation. Occasionally a patient is seen who gives a distinct history of chronic obstruction of the bowels in the sigmoid region. These adhesions of the sigmoid, cecum, appendix, or any other portion of the bowel are of vital importance in round ligament work. As the round ligament is to be shortened three to six inches, it should be rendered free in all directions so that as it is drawn into its new canal, it does not make troublesome or dangerous traction or knuckling of a given portion of the bowel, and further, so that the traction of the bowel may not render the round ligament work useless. I am more and more convinced that the sigmoid should be systematically observed in our pelvic work. The frequent adhesion, kinking, constriction, etc., leads one to believe that this is responsible for not a little left-sided pelvic pain. In freeing the sigmoid we have been inclined to deal with the thickened appendices epiploicæ as though to remove them it were only necessary to tie their base with catgut to check hæmorrhage while in view of the now known diverticulitis it is well to remember that they may contain lumen, that their thickening may come from infection from within, and in removing them we may be opening the bowel and the stump may require treatment accordingly.

Obstructions of the sigmoid partial or complete have been observed during pregnancy and during the growth of tumors. Lehmann records two such cases during pregnancy which complicated the puerperium. I have observed sigmoidal fecal impaction during the first half of pregnancy. This in turn

may be a large factor in retarding the flow of urine from the left kidney and the blood from the limb as the ureter and vein pass under this mass. Munro Kerr, Muriel, and others report cases in which a sigmoid tumor, malignant or benign, has been taken for an ovarian tumor, a fibroid of the uterus, extrauterine pregnancy, etc., and the same mistake may be made in the case of fecal impaction. We have in the hospital at the present time a case in which a supposed extrauterine pregnancy proved to be a pus tube and ovary, the sigmoid furnishing part of the wall, the large element of the pain leading to the diagnosis of extrauterine pregnancy being furnished by obstruction due to great infiltration and kinking of the sigmoid. Another case operated one week ago presented a right ovarian growth lying between the retrodisplaced uterus and the bladder, the pedicle being twisted three complete turns. The sigmoid covered the left part of this tumor and had become extensively adherent to it, furnishing considerable of its blood supply. The sigmoid has been found with chronic obstruction after pelvic operations, in two cases adhesions of the sigmoid to the broad ligament stump and in one case obstruction by adhesions running from the iliac fossa near the round ligament completely over the sigmoid, attaching to the upper layer of the mesosigmoid.

It should be remembered that sigmoidal conditions revealed by the proctoscope may be secondary to diseases of the pelvic organs. In two cases found the bowel perforated in cases of seemingly primary tuberculosis of the tubes and ovaries. I was permitted to open the abdomen of one other patient immediately after death which had been caused by a tubercular infection of the bowels. At the junction of the descending colon and the sigmoid a portion of the bowel wall had been destroyed leaving a hole the size of a half dollar, completely covered by an omental graft, but which might easily give way. These weak points in a bowel wall, the fixed conditions of a flexed sigmoid, etc., make a large hazard in sigmoidoscopy. An exploratory celiotomy is sometimes less dangerous.

In all conditions of primary or secondary infection of the sigmoid it is desirable to have the bowel free from retained irritating hard or soft feces, but great care should be exercised in attaining this result. Andrews reports a case of rupture by air distension and Hessert one through the use of a hose attached to a water pipe. Properly administered enemata and a resulting empty bowel may aid much in the conservative treatment of pelvic masses resulting from infection.

The points I would emphasize in closing are:

1. The intimate relation of the genital tract to the terminal reservoirs of the urinary and alimentary tracts permit of easy communication of disturbances, and pathologic conditions.

2. The sigmoid through its ready adhesions may, like the omentum, serve to wall in a genital infection and save the patient, after which it may through perforation serve as a means of escape for this infection and the resulting pus, or by reason of adhesions, it may introduce new elements of danger through colon bacilli infection and bowel obstruction.

3. The symptoms of constipation, diarrhœa, passage of mucus or blood, the presence of sausage like mass in the left iliac fossa, etc., should lead us more frequently to include the pathologic conditions of the sigmoid in our pelvic diagnosis, especially when there seems to be adhesions on the left side.

4. The associated sigmoidal conditions are undoubtedly primary, in many instances, as they are found in men although adhesions here may be due to infections of the vas but are also very frequently secondary to the disease of the tubes, ovaries, and uterus, as they are frequently observed after definite infections of this tract.

5. An intra-abdominal investigation of pelvic disease should include inspection and palpation of the sigmoid when with few exceptions left-sided and not infrequently right-sided pelvic trouble will be found accompanied by adhesions, obstruction, and kinking of the bowel or making undue traction upon the bowel or the tube or ovary or both.

6. Every pelvic celiotomy should be undertaken with the possibility in mind of meeting conditions of the bowel, ranging from adhesions, thickening, diverticuli, obstruction

to new growths. The extra hazard of intestinal surgery may be projected into almost any case of pelvic surgery and the operator should be mentally and materially equipped to meet the emergency.

7. Adherent, thickened, or inflamed appendices epiplocæ or other projections from the sigmoidal wall must be considered in the light of our present knowledge of diverticuli and diverticulitis and not amputated with the thought only of checking hæmorrhage as a possible lumen may be encountered.

8. On account of the frequent adhesions of the sigmoid, cecum, and appendix to the round ligament or the peritoneum tube or ovary near the round ligament, no round ligament operation should be undertaken without these structures are rendered free for sufficient distance that no kinking may occur or undue traction be made upon the bowel.

9. This frequent pathological condition of adhesion to or near the round ligament is a strong argument against extraperitoneal shortening of the round ligaments.

10. The treatment of acute or chronic infections of the genital tract should include thorough elimination from the bowels, yet efforts in this direction should take into account the possible crippled condition of the bowel through inflammation, dilatation, sacculation, etc., due to the interference offered by adhesions, infections, and inflammatory masses of genital origin.

DEPARTMENT OF TECHNIQUE

OPERATIVE TREATMENT OF CARCINOMA AT THE FUNDUS OF THE BLADDER[1]

Report of Four Cases

By FRANCIS R. HAGNER, M. D., Washington, D. C.
Professor of Genito-Urinary Surgery George Washington University; Attending Genito-Urinary Surgeon Garfield Memorial Hospital

ALTHOUGH the fundus of the bladder is a comparatively rare location for new growths it has been my fortune in the last sixteen months to have four of these cases come to operation. All except the first were operated on as described in the Annals of Surgery, November, 1910. My inability to remove the friable mass in case 1, without breaking the tumor mass, suggested to me the method of removal that was resorted to in the other cases. In the first case the patient had a very large flabby bladder, and although the bladder wall was retracted as soon as the incision was made, the wall collapsed and I found it impossible to determine the location for my incision without inserting the finger in the viscus, although this was done as carefully as possible, the tumor, being very friable, began to break up. I believe it is usually conceded that one of the disadvantages which attend upon the methods generally employed on the removal of new growths from this viscus is the production of trauma to the tumor mass during its removal. However, it is possible with proper care exercised to remove tumors from the fundus and lateral walls of the bladder without the slightest trauma to the tumor mass by the method used in these cases.

The operation is impracticable for tumors of the bladder base, which unfortunately, is the most common situation for the growths. The following is a description of the operation employed: The bladder is irrigated, and if bleeding, adrenalin 1–10,000 is instilled and allowed to remain five minutes. The bladder is then distended with salt solution, and a Nitze cystoscope is introduced. This is held in place by an assistant while a suprapubic incision down to the bladder wall is made. The prevesical fat is well separated and the tissues well retracted by wide lateral retractors so as to give a good exposure of the bladder wall. I thought at this stage it might be possible by illuminating the bladder with the cystoscope to outline the tumor mass by the transmitted light; although the iridescence was caused by the illumination of the fluid, the outline of the tumor mass could not be made out. The growth is then inspected through the cystoscope, the left hand holding the cystoscope; with the right a threaded needle is pressed on the fundus of the bladder, and the dimpling caused thereby is readily seen through the cystoscope. The needle is carried first to the left of the growth at a sufficient distance to give a margin of healthy bladder wall, it is then plunged into the bladder and the suture then drawn through, being held in place by an assistant. The same procedure is employed at the right of the growth and at the lower border. An incision is made through the bladder wall around the outer side of the three traction sutures, the portion of the bladder wall to be removed being clamped as the incision is advanced. The bladder wall containing the growth is lifted up by the clamp and held by an assistant. The fluid left in the bladder is removed by a large syringe through the suprapubic wound to prevent its entrance into the peritoneal cavity and the cavity of the bladder is packed with gauze. The incision in the bladder wall is then carried upwards into the peritoneal cavity and a portion of the parietal peritoneum covering the growth is removed. The bladder and peritoneal wounds are then closed by two rows of chromic gut sutures, a suprapubic drain being left in the bladder.

Case 1. Male, white, aged 71. First seen by me February, 1910. Complained of hæmaturia, and frequent urination. For a year the patient had voided urine on the average of six times during the sleeping hours and

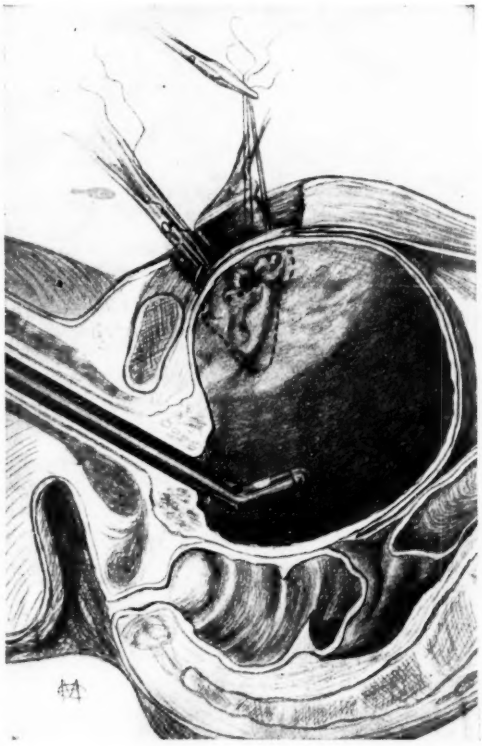
[1] Read before The American Association of Genito-Urinary Surgeons at New York, June, 1911.

every two hours during the day, and during the last two weeks he was up twelve times each night. Many clots being passed with last urine. Bloody urination began three weeks prior to his first visit. On examination prostate was soft and not enlarged, the seminal vesicles not infiltrated. On cystoscopic examination a necrotic tumor mass 5 cm. in diameter was located in the fundus of the bladder in the median line. Diagnosis of carcinoma of the bladder was made and he was operated on February 26, 1910. Sections reported as adenocarcinoma. This is the case in which the tumor was broken up during its removal. Patient made a good recovery from the operation but died thirteen months later from cancer of the throat. He was not cystoscoped for some months before his death but there was no clinical manifestation of any local recurrence in the bladder.

CASE 2. Male, white, aged 43. Was referred to me by Dr. Shaw on March 15, 1910. Eight months ago patient began passing dark, soft, solid masses of tissue in his urine. From two to three days before the passage of the masses the urine would become coffee colored, but after the passage it would clear and become normal. He has passed these pieces of tissue five times during the past eight months. He had no frequency of urination or bladder pain. On his first visit he brought the last piece of tissue he had passed. This appeared to be gangrenous epithelial tissue. The man was well nourished and otherwise apparently healthy. His prostate and seminal vesicles were normal. Cystoscopic examination, March 17, 1910, at Garfield Hospital showed a bladder capacity of 350 cc., a normal bladder mucosa except to the right of fundus, where a partially ulcerated growth of 5 cm. in diameter was noted, covered with black necrotic tissue. The mucous membrane was raised in several areas around the base, showing infiltration of the bladder wall by the new growth. A diagnosis of carcinoma of the anterior and right lateral wall of the bladder was made. Patient was operated on March 19th. Recovered; at this date, fifteen months after operation, continues well.

CASE 3. W. L. C., male, white, aged 71. First seen November 8, 1910. Complained of pain and hæmaturia for three months, urination was painful during and after passage of urine. Nocturnal urination three to four times, every two hours during day. There was reported hæmaturia daily for two months and a severe hæmorrhage two weeks before I saw him. This hæmorrhage extended over a period of twenty-four hours, then urine cleared greatly. On examination patient seemed in good condition except for anæmia. Prostate was firm and slightly enlarged — no infiltration of seminal vesicle or surrounding tissues. No residual urine. Urine contained blood and a few epithelial cells. Cystoscopic examination November 9, 1910, at Garfield Hospital, showed a granulating area to right of median line, 5 cm. in diameter and infiltration of bladder wall could be distinctly made out. Diagnosis of cancer was made and patient was operated on November 11, 1910. Sections showed adenocarcinoma. He made an excellent recovery, and went home in four weeks. At present, eight months after the operation, he has no return of growth and he is apparently in perfect health. Patient sleeps now from 10 P. M. to 6 A. M. without urinating, the urine being absolutely clear.

CASE 4. J. A. J., aged 75. First seen January 19, 1911. Complained of scalding, frequent, and bloody urination. His health had been delicate for years, due to myocarditis. Frequency of urination had existed for six months and blood was noted three months previous to consultation. Urine very offensive for two months. Clots passed. Blood was not a constant factor. On examination patient, while seemingly well nourished, showed weakness and anæmia. Prostate small and firm. No infiltration of bladder case. Cystoscopic examination, January 21, 1911, showed a growth of 3 cm. in diameter in fundus of bladder. This appeared after examination to be the simplest of the four cases. He was operated January 23, 1911. After exposing the bladder wall it was found the new growth filled the entire prevesical space, extending outside over both lateral walls, and was firmly adherent to the pelvis on the right side. No attempt was made to remove anything except the bladder growth. Patient died in five days from intestinal paralysis no evidence of peritonitis being present. I think this case of interest as it shows what lesions are present outside of the viscus that are not shown on cystoscopic examination.



Showing use of sutures to outline bladder tumor.

As far as I am able to learn, this method of attacking these growths has not been tried before. As I have stated, the operation in only applicable to growths in the fundus and lateral walls, but even when the growth is near the base it may be possible to get one or two points to guide us in the incision so as to prevent traumatism to the growth by handling. On the other hand a threaded needle can be seen with the cystoscope when it enters the bladder and the location of the

sutures when in place can be readily noted if slight tension on it be made, so as to cause a stretching outward of the bladder wall at the point of suture. This tension also prevents leakage of fluid and facilitates the introduction of the other suture by preventing the slight collapsing of the bladder wall.

Of the four cases operated, two are dead. But the two operated on by the method here described are well at this time, after fifteen and eight months respectively. These cases may have recurrences, but we do know that the tumor was removed without traumatism to the growth, not even the necrotic tissue being destroyed.

A CASE OF CYSTITIS, MULTIPLE ULCERS, CURED BY EXCISION OF ULCERS.[1]

By FRANCIS R. HAGNER, M. D., Washington, D. C.
Professor of Genito-Urinary Surgery George Washington University; Attending Genito-Urinary Surgeon Garfield Memorial Hospital

MY reason for reporting this case is, first, the apparently hopeless condition of the patient before operation, and second, the great relief afforded by the treatment.

Male, age 60 years, locomotive engineer, health good until one year ago. At this time he first experienced burning and stinging pain in the region of the bladder, his urinations were painful at times, the symptoms continue, although he had the treatment of several physicians. He consulted me in June, 1908. Cystoscopic examination. No residual urine. Bladder capacity 150 cc. More fluid than this caused excruciating pain. There were several small ulcers in the region of the trigone and a small solitary ulcer about 1½ cm. in diameter in left lateral, wall and three in right lateral, wall which had almost coalesced. Fundus appeared normal. Repeated examinations of the urine showed no tubercle bacilli and inoculations of guinea pigs were negative. The urine at this time was slightly alkaline and very purulent, although that from the kidney was free of pus.

He was treated by irrigation and instillations for several months. He improved but did not recover entirely. For one year he performed his work but after this he became a complete invalid on account of his bladder condition. I did not see him again until September 28, 1910, when his urine was very alkaline, malodorous, and filled with pus. His condition was deplorable. He voided his urine every few minutes, and suffered great pain and tenesmus. His bladder was so sensitive that cystoscopy had to be done under ether. This examination revealed slight trabeculation of the bladder wall, a large ulcer in the right lateral wall of the bladder 3½ cm. in diameter, and a slightly smaller one in the left lateral wall of the bladder. There were numerous small ulcers in the region of the trigone. The ulcers were covered with concretions which were so adherent they resisted removal by means of the operating cystoscope. Culture showed staphylococci and numerous other organisms. He was operated October 3, 1910. Large ulcers were excised and the mucous membrane brought together with fine twenty day catgut. The smaller ulcers in the region of the trigone were thoroughly curetted and cauterized with an electric cautery.

The patient's convalescence was at first slow. Concretions formed in the suprapubic wound, under frequent irrigations and instillations of hydrogen peroxide and one per cent silver nitrate solution and the administration of large doses of helmitol and benzoic acid the concretions gradually disappeared and the urine cleared. The suprapubic wound healed four and one-half weeks after operation. The bladder was irrigated for six weeks after healing of the suprapubic wound to prevent contraction. Examinations of removed ulcers showed a simple inflammatory condition.

It is now nine months since the date of operation. The patient is restored to health, he retains his urine three to four hours by day retiring at nine not to arise for urination until five A. M. when he leaves for work. Patient has had no treatment for three months and his urine now is absolutely clear, no pus being present microscopically, not even a mucous shred appearing, the urine being as clear as if filtered.

[1] Read before The American Association of Genito-Urinary Surgeons at New York, June, 1911.

A CASE OF URINARY SUPPRESSION TREATED BY CATHETERIZATION OF THE KIDNEY PELVIS

By F. C. WALSH, M. D., San Antonio, Texas
Formerly Instructor in Genito-Urinary Surgery, Georgetown University Medical School, Washington, D. C.

THE following case history is of interest on account of the rather unusual mode for relief instituted and the, at least temporary, gratifying results obtained.

Through the courtesy of Dr. B. T. Young, of San Antonio, I saw with him on May 23d a patient, E. H. B., male, aged 56 years, who for three days preceding, and following an attack of ptomaine poisoning, had had almost a complete suppression of kidney function. During these three days the total urinary output by actual measurement was a little less than two ounces. The ordinary measures for the relief of this condition had been adopted with negative results. These measures were directed toward stimulating renal secretion, embracing diuretics of various kinds, and local applications to the kidney region, as well as with a view toward securing elimination through other channels, thereby relieving the kidney in its debilitated condition by causing the other emunctories to do more than their ordinary share of work. With this end in view, hot packs, pilocarpin, and cathartics were given.

Assuming the possibility of the anuria being caused by a calculus or kink in one or both ureters, that a blood clot caused by the acute nephritis or other mechanical obstruction might be present, and realizing the gravity of the condition with which we had to deal, and the harmlessness of the maneuver, we decided ureteral catheterization advisable.

On introducing the cystoscope, the bladder was found absolutely empty. After washing and distending with sterile water, a search for the ureters was made. These were quickly located, and the ureteral catheters, No. 5 F, on either side rapidly passed to the kidney pelves without encountering any obstruction. In about two minutes urine from the right kidney made its appearance; this was followed one minute later by urine from the left kidney.

The flow of urine, while slow, as might be expected, not having a hydronephrosis to deal with, was fairly regular. The cystoscope was withdrawn and the catheters allowed to remain in the ureters, their ends being conducted into a bottle placed between the thighs, into which the urine drained.

In six hours something more than three ounces was collected, this being a larger amount than had been secreted during the previous seventy-two hours. At the expiration of this time the catheters were withdrawn, as we felt safe in assuming that renal activity had been re-established. The urine obtained showed both granular and hyaline casts, though not in large numbers.

For several days succeeding this ureteral catheterization, the patient passed urine in almost normal quantity. This continued up to the time of his death, which took place eight days later from exhaustion, his stomach never having been able to retain food, and his general condition gradually becoming worse in spite of the reaction which had taken place in the kidneys.

It is very patent to my mind that here we had a patient in whom suppression was relieved by the mechanical stimulation to the kidney, caused by the passage of the ureteral catheter, and it occurs to me that this method might prove of valuable assistance, provided it was adopted early enough, in eclamptic cases, and other conditions where suppression is imminent.

CORRESPONDENCE

CLOSURE OF THE ABDOMINAL INCISION

By STEPHEN E. TRACY, M. D., Philadelphia, Pennsylvania

In the July number of Surgery, Gynecology and Obstetrics, there is a comment by Dr. D. Tod Gilliam of Columbus, Ohio, on an article of mine in the April issue of the journal entitled "Closure of the Abdominal Incision," in which Dr. Gilliam states that the technique I employ is identical with that described by him in the journal, January, 1909, under the head of "Coaptation and Imbrication Suture for Closing the Abdominal Incision," and claims priority for the method.

From the description in Dr. Gilliam's article it is evident that he uses two layers of sutures to close abdominal incisions. The peritoneum is sutured with catgut and the remainder of the wound is closed with silkworm gut sutures which pass from beneath the fascia to the skin surface.

I will agree with Dr. Gilliam that my technique is probably identical with his in the closure of the peritoneum. Dr. Gilliam does not suture the muscle, while in the technique I describe the muscle is sutured. The manner in which the silkworm gut sutures are introduced and the purpose for which they are used differ somewhat. Dr. Gilliam uses the silkworm gut suture to approximate the fascia and the superficial tissues in the abdominal wall. The loop of the suture is at right angles to the fibers of the fascia. The silkworm gut sutures as described in my article are used to relieve the tension on the chromic gut which is employed for nicety of coaptation under vision and to make certain that the approximation of the fascial surfaces is accurate. The loop of the silkworm gut sutures, as shown in figure 2 of my article, is parallel with the fibers of the fascia. In the technique I described, after the fascia has been accurately approximated, the skin is closed by the buttonhole stitch; fine catgut being used. The tension sutures are then tied over gauze.

My article was not restricted to the description of any particular suture, but described the technique employed in my service for closure of the abdominal incision, and the method of dealing with cases of marked relaxation of the abdominal wall. It was not claimed that there was anything original about any stitch employed. The manner in dealing with the fascia was simply a slight variation in technique of the method originated by Lucas-Championnière about twenty years ago, and was so considered. New procedures in surgery are usually nothing more or less than slight modifications in technique of established methods.

During recent years many articles have been written concerning the overlapping of the fascia in the closure of abdominal incisions by the employment of various suture materials and the introduction of sutures in a number of ways, and it was not considered necessary to give an historical review of the subject. The original idea remains the same no matter how the sutures are introduced to overlap the fascia. They are all slight modifications in technique.

Lucas-Championnière conceived the idea of overlapping the fascia in the operation for inguinal hernia, and employed the method as early or even earlier than 1892. To Dr. Charles P. Noble is due the credit of being the first to use, describe, and make popular the method in America. He began to overlap the fascia in 1894 and used it as a routine procedure in the closure of all abdominal incisions after 1896. The method of Lucas-Championnière is now used with many slight modifications in technique by surgeons all over the country.

TRANSACTIONS OF SOCIETIES

CHICAGO UROLOGICAL SOCIETY

REGULAR MEETING HELD, APRIL 20, 1911, WITH THE PRESIDENT, DR. ROBERT H. HERBST, IN THE CHAIR

DR. HUGH H. YOUNG, of Baltimore, read a paper (by invitation) on "The Advantages of Perineal Prostatectomy." (See p. 269.)

DR. J. BENTLEY SQUIER, of New York City, read a paper (by invitation) entitled "The Merits of Suprapubic Prostatectomy." (See p. 254.)

DISCUSSION

DR. JAMES PEDERSEN, of New York City: Your invitation to me this evening to open the discussion on these papers is another evidence of the cordiality and hospitality of Chicago.

I have seen both Dr. Young and Dr. Squier operate. To see Dr. Young perform a perineal prostatectomy is to make one very enthusiastic over that operation. To see Dr. Squier perform a suprapubic prostatectomy is to make one equally enthusiastic for that operation. A few years ago I had the temerity to present a paper before the American Association of Genito-urinary Surgeons, in which I cited certain statistics, and made the point, that end results were needed in order to determine the relative merits of the two methods. We certainly have heard to-night such a presentation of the results, both from Dr. Young on the side of perineal prostatectomy, and from Dr. Squier on the side of suprapubic prostatectomy. From these results and from my own experience, it seems to me that the end results will compare just about equally. Thus we are confronted by the original question, which route shall we select as the operation of choice? Dr. Young has very graciously yielded the point, and said that he does not aim to make or select any operation of choice. The question, therefore, reduces itself to that of the personal equation: the individual operator will perform that operation with which he is the more familiar. As I have said, I have seen Dr. Squier operate. We were associated for several years and we went together through a cycle of experience very much as Dr. Young did, with this difference: we began with the Bottini operation, then tried out perineal prostatectomy, and later adopted suprapubic prostatectomy as the operation — I will not say of choice, because I have ruled that expression out — but as the operation that can be more quickly performed, with less apparent traumatism to the patient, and as giving, it seems to me, the better average end results.

There were one or two points which I noted as the papers were being read. I shall touch on these briefly, without any attempt at sequence, if you will allow me. Dr. Young spoke about the healing of the fistula. It seems to me, as I have already intimated, that a suprapubic fistula will heal as quickly as a perineal. There is just this one difference: Dr. Young gets his patients out of bed earlier than we can after the suprapubic method. However, we set the suprapubic patient up in bed, thus effecting a compromise. Suprapubic fistulæ heal about as promptly as those following the perineal operation—at the end of two or three weeks—largely depending upon the vitality of the patient and his recuperative power. Of course some cases take longer.

Dr. Young and Dr. Squier laid considerable stress upon the preparation of the patient before operation. That is truly a most valuable adjunct to the success of the operation. Dr. Young spoke with emphasis of the necessity for duly considering the patient who comes with a large quantity of residual urine, and who has not led a systematic catheter life. Such a patient should go through a period of preliminary treatment, as mentioned by Dr. Squier.

Both speakers alluded to the small fibrous prostate. It would seem to me that Dr. Young has solved the problem of the small fibrous prostate by his punch operation. I operated on a case last fall in which I encountered a small and very fibrous prostate. Through an error of judgment I spent too much time enucleating the obstructing portion, largely to gratify the patient's physician who was present at the operation. The patient was an elderly man, and although properly prepared for the operation, died a few days later of pneumonia. I believe his

life could have been saved, if, instead of persevering with the enucleation, I had simply, with the prostatic rongeur, taken out a wedge-shaped piece from the constricting ring. I believe it is not always possible to make a sufficiently definite diagnosis as to the character of the enlargement before the bladder has been opened. In discussing the preservation of the patient's sexual power, I think we should distinguish accurately between sterility and potency. Of course, it is desirable to preserve both the patient's virility and potency. I believe, however, that in the case of most patients who come to prostatectomy, it is enough to say that potency will be preserved. This we can say with considerable confidence. The main advantage in prostatectomy does not lie in preserving the patient's virility, or power of procreation. Procreation at the advanced age of the average patient undergoing prostatectomy, is scarcely to be desired. It is sufficient, therefore, if he retain his potency.

Dr. Young brought up the interesting subject of prostatectomy in the presence of tabes. It is a very fine point in differential diagnosis, in the presence of tabes, to determine whether the retention of urine in the given case be due to the tabetic bladder or to the enlarged prostate. Of course, the age of the patient will help at once; but I am speaking now of the class in which it is highly probable that the retention may be due to enlargement of the prostate, and not solely to tabes. A year or so ago, Dr. Keyes, Jr., of New York City, read an interesting paper before the New York Urological Society on this subject, and in the discussion the point was raised that in those cases in which good results had been obtained the retention may have been due to enlargement of the prostate, and not to the tabetic bladder, pure and simple.

Dr. Henry J. Scherck, St. Louis, Missouri: It would be folly for me at this time to enter into a discussion as to the relative merits of either route. The question to-day resolves itself into the taking of testimony on the part of those who are doing this kind of work. For years I have been doing prostatectomy and I wish to state here that I am pretty well convinced, after considerable experience with the suprapubic route, that it answers the indications for my purposes preferably to the perineal. In the last few years in my service in several hospitals I have practically adopted the suprapubic method in dealing with enlarged prostates. My reasons are that the end results have been better. In the hands of such masters as Dr. Young and others, there is no question but that the perineal method is followed by admirable results, and with such experts this method cannot be very well improved upon, but in the hands of the average surgeon who is doing this work, one who has to work out his own salvation, it is my experience the results are better from the suprapubic method. I do not get incontinence following this method of operating. I do not get troublesome fistulæ from the suprapubic method, and, as I have said, I get decidedly better end results in every particular. Drainage is just as good if properly arranged in suprapubic cystotomy and one merely knows more about the intravesical conditions.

I have seen the work of men in St. Louis and in other cities, and often observing the results of their work with the perineal method. I have noticed many complications, so that it appears to me that unless the operation is done by one who is especially skilled, that in the hands of the average surgeon the suprapubic method is to be preferred.

Dr. William T. Belfield: In the first place, I would like to emphasize Dr. Pedersen's distinction between sterility and potency. It was really surprising in listening to the papers of the evening to hear that the preservation of a man's potency is intimately associated with the preservation of the ejaculatory duct. That is a very common misapprehension which, while of minor importance in this question of prostatectomy, should be eliminated. It does not matter whether the ducts are preserved or not, so far as the patient's potency is concerned, as he has usually done all the procreation before his prostate enlarges to which he is entitled, so that let us once and for all dismiss this matter of the ejaculatory ducts and potency from the situation. It is true, that if the verumontanum be badly damaged, a man's potency may be impaired, and there, it strikes me, is where the loss of his potency which sometimes follows prostatectomy is to be explained. It seems to me, that we have to consider that the removal of the prostate through the perineum is surgically preferable to the suprapubic opening as anatomically preferable. I do not think there can be any doubt of the greater mortality necessarily attendant upon suprapubic prostatectomy, and that comes not from confinement in bed alone, but from sepsis. The danger of sepsis is much greater because drainage is less perfect. Of course, sepsis above the bladder can easily be avoided by making the operation in two stages. The sepsis that is most dangerous is that which occurs from the raw surfaces from which the prostate has been removed. There are two or three ways in which

that sepsis may be avoided. Away back, when suprapubic cystotomy was first revived in the early eighties, it was proposed, and by some practiced, that the patient should be made to lie on his abdomen after the suprapubic operation. That, of course, is not always feasible, and for that reason cannot be taken into account as a regular method, although it is practiced occasionally even now. But it strikes me the one operation which has been somewhat contemptuously alluded to here to-night is rather the operation of choice, and that is a median perineal urethrotomy, the enucleation of the prostate through that channel, and with the necessary division of the prostatic lobes, so as to make them easily removable through a properly small distension of the vesical orifice. I believe that is the coming operation because it combines the anatomical advantages of the perineum without the anatomical disadvantages.

There are so many who can speak on this subject, and do it so well, that I will deprive myself of the privilege of mentioning the cause of incontinence of urine, which strikes me is not on account of the damage to the membranous urethra, but of damage to the internal vesical sphincter.

Dr. Gustav Kolischer: In contrasting methods of operating it is necessary to meet on a basis of common understanding in order to discuss them properly.

We should discuss a surgical method as to three points: First, the primary mortality; second, the untoward incidents due to the peculiarities of the method in question, and, third, the remote results.

With regard to the primary mortality, it is true that the statistics of former years will show that the primary mortality of suprapubic prostatectomy was greater than the primary mortality of the modern perineal prostatectomy.

But no one will doubt that laparotomies as done twenty years ago gave a bigger mortality than the same operations of the present day. Suprapubic prostatectomy should and must be done on modern, proper surgical lines. I am confident that such a prostatectomy will not give any greater primary mortality than any other bladder operation performed upon old men. We cannot draw conclusions from buttonhole suprapubic incisions and then compare the figures with the results of modern perineal operations.

As to the untoward incidents due to the peculiarities of the perineal prostatectomy I would like to mention the always imminent danger of a perineal fistula persisting after operation. If one considers that such mishaps are constantly occurring in the practice of the most expert operators, it is but fair to ascribe them not to lack of skill but to the peculiarity of the perineal method; in other words this danger is intrinsically connected with the perineal route.

Now such a fistula is a very serious proposition — it inconveniences the patient to the utmost, and it is proven by experience that such fistulæ as a rule defy the efforts of the best surgeons in closing them up. It is furthermore a matter of record that sometimes perineal prostatectomy will lead to incontinence or to the establishment of a traumatic stricture.

Another objection to perineal prostatectomy is the impossibility of changing or amplifying our diagnosis during the operation.

It is impossible to explore with any certainty the interior of the bladder by introducing a finger through a perineal incision, whether this opening has been made by the rather elaborate dissection which Young employs or by simply cutting through the perineal raphè. This digital exploration of the bladder becomes even more unsatisfactory if the patient is placed in lithotomy position with elevated hips. I have seen cases in which the most experienced operators overlooked calculi and tumors in the bladder during perineal prostatectomies. Now in quite a few cases it is impossible to make an exact complete diagnosis before the bladder is opened. Rectal and bimanual palpation will in some cases furnish but meager information and even cystoscopy is unsatisfactory or even impossible in some cases. I am able to make this latter statement with some authority, because my cystoscopic experience covers more than twenty years.

I furthermore wish to call attention to a certain group of cases which I have observed and described. These patients show all the classical clinical symptoms of prostatic hypertrophy but the suprapubic operation will show that there is simply an edema of the bladder and prostate existent, that will disappear after the incision of the bladder, thus reducing the intended prostatectomy to a simple cystotomy. This diagnosis cannot be made at the instance of a perineal incision and therefore in such cases an unnecessarily extensive and mutilating operation will be performed.

As to the contention that perineal prostatectomy always enables the operator to preserve the prostatic urethra, I shall demonstrate here a series of prostates removed by suprapubic operation. As you will see in all of these cases, the prostate is hypertrophied all around the urethra.

The urethra was embedded in a thick prostatic ring and was removed with the gland—all these cases gave perfect results. It is absolutely immaterial whether the prostatic urethra is removed or not, if only the internal urethral orifice is preserved.

To sum up: a properly conducted suprapubic prostatectomy furnishes the possibility of an exact and complete diagnosis, it prevents formation of traumatic stricture, and does not offer the danger of postoperative incontinence, and finally, fistulæ will never remain in the non-malignant tumors of the prostate.

I admire the skill of certain surgeons who perform perineal prostatectomy. The suprapubic operation is however a cleaner surgical proposition and based on sounder surgical principles.

I am convinced that in a few years the suprapubic operation will be the method of choice with the majority of operators.

Dr. L. W. Bremerman: I have only a few words to say in discussing these two very complete papers. After hearing Dr. Young's compilation of statistics, I have almost been converted to do the perineal procedure entirely, and after hearing Dr. Squier's paper, I am inclined to do all operations suprapubically, but my experience, of course, as compared with the experience of either of these two gentlemen, is limited. I have done the perineal in one case where I have done the suprapubic in four, the ratio being four to one. I have heard very clearly outlined the various methods, technique, and so forth, and I am very glad to hear Dr. Young and Dr. Squier lay particular stress upon the preliminary treatment of these cases, because I think that is exceptionally important, particularly the test for kidney function. I have had quite a little uphill fight in Chicago in regard to the test for determining the functioning of the kidney, some condemning it, and some favoring it, and I am glad to see others coming along and favoring this thing with me, and I do believe that if functional tests were carried out in every one of our operations on the genito-urinary tract, we would have less mortality from anuria, renal complications, etc. There was nothing mentioned particularly about the after treatment of these cases, which is another important feature. I think the after treatment is almost as important as the operative technic itself. I have divided the after treatment into three stages, that immediately following the operation, the period of convalescence, and a period lasting, if I can control the case, for a period of six months. The things to be looked for immediately following operation are shock, hæmorrhage, anuria, and sepsis. Shock can be controlled very easily, and the condition of sepsis can be guarded against by preliminary treatment, such as irrigation of the bladder and knowledge as to the renal function. The choice of anæsthetic may be considered. In all my work on the genito-urinary tract I employ gas and oxygen anæsthesia, having discarded ether and chloroform. The possibilities of shock from this anæsthetic are far less than from the others. Sepsis can be guarded against by drainage. Dr. Kolischer may have been fortunate enough to drain these cases, but I have not run across such an easy type of cases as he mentions. The septic urine will infiltrate the tissues, and space of Retzius and complicate matters exceedingly, making the dangers of sepsis more marked. I have devised a little drainage apparatus which will keep the bladder empty and will absolutely reduce to a minimum the possible chances of sepsis, and I have gotten the consent of Dr. Schmidt to try this apparatus on his next suprapubic prostatectomy, and I hope to convince him of its value. Those who have seen the apparatus at work and are using it are getting excellent results. Immediately after the operation the patient is taken back to his room, hot salines are administered per rectum, and this is kept up for a period of twenty-four hours. I get my suprapubic cases up out of bed as soon as possible; after forty-eight hours I have them sitting up; within five days they are walking around, and my results by the suprapubic method are just as good as those by the perineal, and the operation is shorter, can be done with less loss of time, and I think by reducing the operative procedure to a minimum in that length of time you reduce the possible chances of shock to the patient.

Dr. Young did not speak of his mortality due to shock, but I have run across a striking instance in a relative of mine, who died a few minutes after suprapubic prostatectomy due to shock, and I think this one thing should be guarded against as well as others.

Dr. M. L. Harris: One might be inclined to think from the vigor with which some of the speakers have tried to defend the various routes, that it was necessary always to use one route or the other. The fact that one says you must always use the suprapubic, and another that you must always use the perineal, shows that neither is right. It is a mistake to think there is only one way of doing a thing. It is very likely in cases of this kind that both methods have their merits, and it is only necessary to differentiate the cases in which each particular method has its

advantages. The first prostatectomy which I did, I did suprapubically, and I performed quite a few of them by that route before I did the perineal. It looked to me the best. Then I did the perineal, and that looked to me the best. When Dr. Young first brought out his dissection method I did a number of operations in that way. I have seen Dr. Young do the operation. He does it very beautifully. Nothing can be better than to see Dr. Young enucleate a prostate through the perineum. I am convinced, however, that Dr. Young makes too extensive a dissection in removing the prostate by the perineal method. You all remember the work in this line done by Dr. Goodfellow, who is now dead, of San Francisco. When I first met him and heard him describe the method by which he removed the prostate, I was astonished. I did not know whether to believe him or not. He used to do these operations in his office; the patient would come in; he would inject a little cocaine into the spinal canal, make a perineal incision, introduce the finger, remove the prostate in a few minutes, and then send the patient home. He did a great many operations that way, and I was surprised. But I learned a great deal from him how to remove a prostate through the perineum. I fully agree with Dr. Belfield as to the method of removing the prostate through the perineum. It is a method I have employed for some time. A small median incision is made, and it is unnecessary to dissect out the prostate much, so that you can see it and pull it out. In pictures we often see the prostate shown as bulging out, but it is not that way in the living subject. A small incision is made through the urethra, just at the beginning of the prostate, introduce the finger into the bladder, make a small incision in the prostatic urethra laterally, and enucleate from the side. This can be done in a few minutes in the cases that are suited to this method. But not all cases are suited to that operation as I intimated in the beginning of my remarks. But nowadays we attempt to make a diagnosis of the case, not simply that the patient has an enlarged prostate, but we use the cystoscope, and we find out what kind of an enlarged prostate the patient has, where it is projecting, what parts are enlarged, and we try to differentiate whether the case is most easily to be removed from below by this simple operation, or whether it is a case which probably had best be dealt with from above. I think some of these prostates can best be removed from above, and I go above whenever I find such cases. In my experience, by using the cystoscope in this way one can tell whether the case can best be removed by the suprapubic operation or not. I do not think the perineal route is the only way to remove the prostate; nor is the suprapubic route the only way. I think the bladder drains best when it is drained through the perineum. If one will compare the cases in which suprapubic drainage is used, and the length of time it takes the wound to heal, with the simple perineal drainage, and the time it takes these wounds to heal, he will soon become convinced that perineal drainage is infinitely better than suprapubic. I never had such a beautiful illustration of this as I had recently in the hospital where I had two brothers, both past seventy years of age, on whom I operated. In one case I did a suprapubic operation, and in the other a perineal. Both of them were patients from out of town. The patient on whom I did a perineal operation was up and had gone home many days before the other man got out of bed. I had to do a suprapubic operation on the one because he had two large calculi. This was a case for differentiation. I would not remove a large prostate with calculi through the perineum, as I think such cases are more suited to a suprapubic operation. The suprapubic method has its field of usefulness in selected cases, just as the perineal has its field of usefulness in selected cases. However, I think the majority of the cases are best done perineally. When any one tries to make it appear that there is only one way of doing things he is likely to become biased. He will be operating on some cases by a particular method which is not the best way to treat the particular case in hand, just to be consistent, when in fact by so doing he shows bias.

DR. L. L. MCARTHUR: Without taking sides for one route or another, I would like to rise for the purpose of letting shine a ray of hope for operators who have been unfortunate enough to have incontinence of urine follow their prostatic operations, which ray of hope had its origin with the recently deceased, and by those who knew him, much lamented Dr. Sam Alexander. Before a meeting of the Clinical Surgical Society in New York recently, he stood nine patients, who had had prostatectomies done on them, some perineal, some suprapubic, all of them coming to the hospital with incontinence, some from Baltimore, some from Philadelphia, some from New York, some from Boston. With these nine patients standing up in front of us, whose bladders had been previously filled by a catheter with water, he made them urinate and stop urinating, right down the row, and made each patient control his bladder. He had taught the musculature of

the bladder, which (ordinarily) is under organic control, to accept the voluntary messages which should go to it, if the will of the patient directed them to it; patients who had gone for weeks, months, and years with incontinence because of prostatectomy, were taught to utilize their voluntary muscular fibers, thus enabling them to control the urine properly again. It is a duty we owe to the doctor to promulgate so good an idea.

Dr. Banes, of St. Louis, Missouri: There is one point I would like to dwell on. I think in some of the cases which were described as having terminated fatally from sepsis, that possibly death might be due to pulmonary infarct. In a paper written by the speaker three years ago he pointed out an analogous anatomical condition between the prostatic plexuses of veins, so beautifully shown in the illustrations by Dr. Squier, and the uterine sinuses. We all know that after labor it is a common thing to have clots swept from the uterine sinuses into the general circulation, and that same thing occurs in some patients after prostatectomy, the clots getting into the prostatic plexuses of veins.

Dr. Young's work is undoubtedly marvelous, and I believe the great number of critics who oppose Dr. Young in his methods do so because there is a lack of the personal equation. There is no doubt that the Young operation in the hands of Dr. Young is marvelously admirable.

Dr. Bremerman's device we are using in St. Louis and it has proven valuable. Dr. Lewis and I use it almost daily in our hospital work.

Dr. L. E. Schmidt: As to the method of estimating the functional capacity, which has been outlined by Dr. Young, I might state that we have used it in Chicago for the past year. I am inclined to believe it is a definite guide as regards the urinary function, so that if the coloring matter is low, we are on the safe side by not operating, but if we can raise the functional capacity to such an extent that sixty-five per cent of the coloring matter is being eliminated within two hours, it is safe to operate and we can state with reasonable assurance that the vast majority of these patients will then not die from any urinary insufficiency following an operation. If we could have some kind of method to estimate the functional capacity of the lungs and heart, such as this method gives here, I am sure we would decrease the mortality enormously. Personally, I can say that I have lost very few patients after prostatectomy in late years from anuria or uroseptic conditions, but the deaths have been due to pulmonary or cardiac complications.

A few words as to the complications following prostatectomy. It has been stated to-night that there are practically no complications following suprapubic prostatectomy. I am inclined to believe that every man who has followed surgery of the prostate and has had the opportunity to see the results of others as well as his own results, has seen following suprapubic prostatectomy incontinence that has lasted for a long period of time, contractures, strictures, epididymitis, suppuration of the testicle, and complications of that kind. I recall that two years ago I had in the hospital under observation at one time, five prostate cases that had been operated on by other surgeons, and three of them had complications resulting from suprapubic prostatectomy. I am confident that operations which remove the prostate in toto lead to strictures and contractures more so than if an attempt is made to keep the urethra intact. There is no reason why we cannot keep the urethra intact in operating on cases of this kind. It is not without the province of surgery to divide the anterior commissure and slip the prostate from the urethra. It has been done, and I have done it myself. There are cases where the anterior commissure can be divided, and where the prostate can be readily enucleated completely. By taking the cleavage entirely around the prostate, then pushing the finger along the urethra to get up to the membranous urethra and dividing the anterior commissure, it is possible to remove the prostate intact in certain cases.

So far as the retention of urine and urinary symptoms such as incontinence are concerned, if the operation is done as Dr. Young has outlined, the possibilities of leaving small remnants of prostatic tissue are no greater by one route than by the other, if it is possible to make an inspection from above. As regards incontinence of urine it can be avoided by making incisions at the apex of the prostate and not in the membranous urethra when you operate from below. The tags that are often left create urinary disturbances and lead to obstruction and may also be a cause of incontinence.

Dr. Hugh H. Young, Baltimore (closing the discussion): I distinctly stated in my paper that I did not come here as an advocate of any one method. I came here to dwell largely on my troubles and my failures and to give you truthful statements of unsatisfactory results. I can conscientiously state that it is possible to reach and explore the bladder with a finger through the perineum. If Dr. Kolischer will come to one of my operations, I will give him a chance to introduce his finger into the neck of the bladder and

enable him to feel the sphincter in almost every case of prostatic enlargement I operate on. If you have decent perineal exposure you can do this. He asserts that the suprapubic exposure is necessary to see what is present. If one uses the modern cystoscope, and has the diagnostic acumen to tell what is there and has an experienced eye, he can generally determine all that is necessary before the operation. Some operators have a predilection for the suprapubic over the perineal operation. Every one is likely to get the best results from the method he most frequently employs. A large prostate, projecting far into the bladder, soft, and of the adenomatous type, is easily removed suprapubically. There are many cases in which I knew, beforehand, that the prostate could be removed more easily suprapubically than perineally, but I felt that their chances of ultimate life would be better with perineal prostatectomy, because I was able to get these patients out of bed quicker after a perineal operation. I feel that the drainage of an extravesical cavity is better than the drainage of an intravesical cavity which is connected with a suppurating bladder. The convalescence is simpler. Dr. Harris and others have shown this. I think the opinion of the surgical world is that a perineal incision gives you a simpler wound, but I do not by any means do all operations through the perineum.

I think Dr. Harris is wrong in saying that my dissections are too extensive. It is simply a blunt separation of tissues which have natural spaces that are easy to get at. It is a spreading of natural spaces.

My reason for doing prostatectomy perineally, instead of through a median incision, is this: I have great respect for the muscles which make up the external sphincter. Through a median incision, with the finger in the rectum, it is possible to go back of the bulb and open the membranous urethra, but usually one incises the bulb and goes through the external sphincter. Many cases of incontinence I have found to be due to the fact that the triangular ligament and external sphincter have been divided. When you pull large lobes out through this median opening you may lacerate and tear the perineal musculature considerably. When you go in back of the bulb and the triangular ligament into the membranous urethra (where it is truly membranous, and there is no external sphincter around it), there is no danger of injuring these or the external sphincter, if you are careful.

As to perineal fistula, I have seen only four in 440 cases, and in these four patients the fistula is not a terrible thing to them, as we have been told. A few drops of urine come out after the patient urinates, but not continuously. As between suprapubic and perineal fistula, the former usually leaks all the time, but the latter does not, and when a man says that patients with perineal fistulæ are in terrible discomfort all the time, he simply knows not of what he speaks.

CHICAGO GYNECOLOGICAL SOCIETY

REGULAR MEETING HELD MARCH 24, 1911, WITH THE PRESIDENT, DR. G. KOLISCHER, IN THE CHAIR

PUERPERAL BLOOD CLOT

DR. CHARLES E. PADDOCK: The specimen is of interest mainly because of its size, being a puerperal blood clot, forming a complete cast of the interior of the uterus. It measures 7.5 cm. in its widest diameter at the fundus and about the same in length to the cervix. The patient suffered from after pains. The fundus was higher than normal and a diagnosis of retained blood clot was made. Owing to the extreme serious condition of the patient however, and her pleadings to be left alone, the uterus was not irrigated, neither was any attempt made at compression to expel the clot because of imminent intestinal perforation due to typhoid lesions.

I have seen many cases of retained clots but none so large, neither have I found it necessary to wash out the uterus: and I see no reason why in most cases, the patient should not be given an opiate to quiet her. The clots generally pass away within a few hours. In this case the clot remained for ten days.

DISCUSSION

DR. J. CLARENCE WEBSTER: This week I saw a case in which, following a four-month abortion last January, a clot formed in the uterus and was expelled about six weeks afterwards. It was not as large as that described by Dr. Paddock.

I once saw a case where a clot like this one formed after labor. It remained in the uterus about a month, when it became infected. The foul smelling discharge caused the diagnosis of malignant disease to be made. When the mass was removed it was found to be almost entirely fibrous, containing very little placental tissue at the site of attachment.

DERMOID CYST OF OVARY

DR. R. W. HOLMES: A woman, 28 years old, married three years, in March, 1909, miscarried at about the third month, the process being entirely spontaneous. I saw her three weeks ago with a history of seven weeks' pregnancy. On the first examination I thought that I felt something on the left side. The next day this mass had prolapsed into the cul-de-sac. There was a distinct pedicle, and I made a diagnosis of pregnancy with ovarian cyst. I removed the cyst the next day, and it proved to be a dermoid. There was no reaction, and the patient went home on the fifteenth day.

FIBROID OF UTERUS

DR. R. W. HOLMES: The patient, a widow who gave a history of illicit intercourse, had a little bleeding from the uterus. Her menses were fairly regular and about as usual. She thought she was pregnant. Dr. Lindquist examined her and thought he found a symmetrically enlarged uterus of about the third month of pregnancy, which I was able to confirm. The uterus was somewhat boggy, perhaps not exactly typical of a pregnant uterus of that period. The cervix was soft and edematous. The softening of the lower segment was not characteristic. We waited a week or two, examined her a number of times, and I finally determined that she had a chronic metritis, with, possibly, a submucous fibroid. I opened the abdomen and removed this tumor (showing specimen).

DR. E. A. GRAHAM: I received the specimen immediately after its removal. The uterus was extremely soft and boggy, and symmetrically enlarged. On section I found a livid red large mass in the center of the uterus, resembling raw beefsteak. The center of the mass was extremely soft and friable, but did not bleed readily. In all respects it resembled the red degeneration of a fibroid described by Virchow years ago.

Microscopically the tumor presents nothing particularly unusual. One thing unusual is that this is apparently a submucous fibroid. Nearly all these red degeneration fibroids have been described as being interstitial tumors.

One of the latest most extensive reviews of the subject was made by Fairbairn in the Journal of Obstetrics and Gynæcology of the British Empire. He finds that all his cases were interstitial tumors. They all occurred during the childbearing period, and usually were closely associated with pregnancy, either coming on during or immediately after pregnancy. The most important and most frequent symptom was pain. He stated that it is the one symptom which is diagnostic of these tumors.

I, ECLAMPSIA WITHOUT CONVULSIONS. II, NEPHRECTOMY DURING PREGNANCY, WITH CONTINUATION OF THE PREGNANCY. III, PAINLESS LABOR

By FRANK W. LYNCH, M. D.

CASE OF ECLAMPSIA WITHOUT CONVULSIONS

Mrs. S., aged 35. Family history negative. No serious illness in the past. Menstrual history uneventful.

Had been pregnant three times previously. Oldest child nine, youngest five. Normal easy confinements. The patient stated that in the previous pregnancies she had been strong and well and no albumen had been observed during any pregnancy.

The pregnancy, terminating in eclampsia without convulsions, gave a history of the last menstruation about September 1, 1909, and until April 20, 1910, the pregnancy was absolutely uneventful. On May 4th she complained of slight headache, poor appetite, and pain in the left lumbar region. Dr. Loeb noted a slight puffiness of the face and tenderness in the region of the left kidney. There was no edema of the lower extremities and an examination of the heart was negative. The urine was somewhat scanty, highly colored, and high specific gravity. The twenty-four hour amount was taken, but unfortunately was not recorded on the chart, although Dr. Loeb distinctly remembers that it was diminished in bulk. Three-tenths per cent albumen, numerous leucocytes, and a few red blood cells were found in the specimen. No casts were seen on careful search. There was no sugar.

She was ordered to bed and put on a liquid diet. She was warned of the seriousness of her condition and the possible necessity of inducing labor. Under treatment the urine became more abundant, the albumen and leucocytes decreased and the patient maintained that she felt well. At any rate, all physical findings disappeared. It would appear that the patient did not obey the strict injunction to remain in bed and that she denied any subjective symptoms because she wished to carry pregnancy to term. However, Dr. Loeb's history distinctly shows that the physical and laboratory findings were much improved.

Labor began at 6 A. M. on June 1, 1910, and she went to the Washington Park Hospital. Dr. Loeb arrived at 7:30 and found that she had been given one-fourth grain of morphine sulphate on account of intense epigastric pain. When seen by Dr. Loeb she was still complaining of an intense epigastric pain just under the ensiform cartilage which she described as a stabbing pain, nearly continuous and differing entirely from labor pains. An examination showed that the labor was well advanced and the os completely dilated. About 8 o'clock she complained of becoming faint, stated that she could not see as well and that the pain was disappearing. Within one or two minutes she became deeply comatose without preceding convulsions, the breathing became deep, somewhat stertorous and the face livid. The forceps were applied without anæsthesia and an eight months' child was extracted without difficulty. The child weighed five pounds and is still living. Placenta was expressed by modified Crede method ten minutes later. The patient bled extremely little. I saw her shortly before noon when the woman was in well marked coma with somewhat stertorous breathing. There was a faint odor of acetone about the breath. The aortic second sound was sharp and snappy, otherwise the heart was negative. There was extremely little edema of the extremities. The liver dullness was apparently not increased and the edge appeared to be directly under the costal margin in the mammary line. The pulse was about 120, rather soft, and the blood pressure was 100. The temperature was 100½° F. Throughout the day the patient remained in coma, the pulse became gradually more feeble, there was complete suppression of urine so that but a few centimeters could be obtained with a catheter during the day, and exitus took place at 9:30 without any convulsive seizures. We are perfectly certain that there were no convulsions during the thirteen hours she was in the hospital, and there was constantly one medical attendant in the room in addition to at least one nurse.

Fortunately an autopsy was secured and performed by Dr. Loeb and myself within a half hour after exitus. At that time a thermometer placed in the uterus recorded a temperature of 107½° F. The liver was rather pale, suggesting fat, and was everywhere mottled with the hæmorrhagic areas which you see on the specimen. It weighed 2,200 gms. There were pin point hæmorrhages in the adrenals, the kidneys were swollen as if from an acute inflammation. On section it dripped blood and the capsule could be readily detached. Subserous petechiæ were noted in the pancreas, spleen, heart, and lungs.

Unfortunately we were not allowed to remove the thyroid. The uterus presented the appearance of the ordinary postpartum organ.

A specimen of urine which was obtained by catheterization immediately after delivery was analyzed, showing multitudes of various granular, epithelial, and blood casts, together with an extremely high percentage of albumen. The total nitrogen was far more than one would expect in even a concentrated specimen of similar amount and the ammonia nitrogen figured as 16 per cent. The small size of the specimen, 30 cc., prevented us from making further observations.

CASE OF PREGNANCY FOLLOWING REMOVAL OF THE KIDNEY DURING PREGNANCY

The patient is a strongly built woman 35 years of age. In early life she was strong and healthy, having had only typhoid fever at 19 years of age, with good health following. Shortly after this she reattained her normal weight of about 165 pounds.

During her 22d year she suffered from what appeared to be a fairly typical attack of renal colic, with pain in the region of the right kidney, blood in the urine, etc. An X-ray taken at that time was negative. She recovered quickly and felt well again after a week or ten days. Following this attack her general health was not quite as good as previously, her weight gradually decreased to 145 or 150 pounds, and from time to time she had heavy nagging pains in the right side and back, most marked when she was tired. There was no other definite attack of colic until four years ago when she had again severe pain in the right kidney region. No vomiting with this attack. Dr. Herrick found a small amount of blood in the urine, but the X-ray again revealed nothing. Dragging pain in her side continued off and on, although it was never severe and she believes that it was never accompanied with elevation of temperature.

Early in 1909, when about six weeks pregnant and when she had some morning sickness, she suddenly was seized with a severe attack of renal colic, severe right-sided pain, nausea and vomiting, together with a small amount of blood in the urine. For two days she was quite ill after which she gradually improved, although the dull pain continued. At the hospital the catheterized specimen of urine was negative for bacterial growths and casts; there were comparatively few blood cells and leucocytes on the slide. The X-ray revealed a flat oval stone, apparently about 2 cm. across. A few days later Dr. Bevan operated, and found the stone in the lower pole of the kidney. As it appeared too large to be removed by pyelotomy he split the kidney and removed the stone, which was imbedded in the tissue. Dr. Woodyatt pronounced the stone to be of the calcium oxalate type. The immediate recovery from the operation was satisfactory and the bleeding from the ureter gradually decreased, although it did not entirely cease. There was however, some leucocytosis and a fever which ranged from 99° to 100.5° F. The eighth day after operation the bleeding from the ureter became more marked and gradually increased. The hemoglobin and red blood cells diminished rapidly from day to day. On the thirteenth day there was a slight chill and a severe hæmorrhage from the bladder so that that organ became markedly distended with clotted blood. On the fourteenth day Dr. Bevan removed the kidney under ether.

The hemoglobin at that time of nephrectomy was twenty-six per cent (Dare), the red blood count 1,640,000, and the leucocytes 17,500. The kidney pelvis contained a large clot of blood, and there were necrotic areas in the kidney extending from the pelvis to the cortex, most marked about the sutures. The perirenal fat was also slightly involved. A diplococcus which retained the gram stain was recovered from the necrotic tissue of the kidney. The patient made a rapid recovery from the operation, although the blood in the bladder became infected and the urine became highly ammoniacal. After several days the clot disintegrated and was passed in small pieces with the urine. She rapidly improved, gained in weight and strength, and the hemoglobin rapidly reached normal. There was no marked effect upon the pregnancy, and she came to full term and was delivered by me in August, 1909.

Very frequent examinations were made of the urine, which at no time contained more than the faintest trace of albumen with the nitric acid test. The specific gravity was somewhat high, although the urinary amount was normal. During labor and immediately following, the urine showed albumen and casts. This lasted but a few days. Forceps were applied shortly after the complete dilatation of the cervix. Following delivery she gained in strength and her weight increased to 176 pounds.

In December, 1909, she developed the typical symptoms of exophthalmic goiter, a pulse of 110 to 140, tremor, the typical eye symptoms, weakness in the knees, dyspnœa, enlarged glands, lymphocytosis, etc. Her weight now fell to 125 pounds. Dr. Billings advised rest in bed, which

was maintained for five weeks without marked improvement. Consequently in May, 1910, Dr. Bevan ligated both superior thyroid arteries following which she has made rapid recovery; again attaining a weight for several months past of 160 to 165 pounds. The pulse averages 80. Three weeks subsequent to the last operation she was able to start on a trip to Europe.

The patient is again pregnant and is due in July. The urine is examined every few days and has continuously been normal.

Concerning pregnancy after nephrectomy we quote from an abstract in the Journal of the American Medical Association on March 18, 1911.

"At the recent annual meeting of the French Société d'obstétrique, de gynécologie et de pédiatrie, several members reported cases of apparently normal pregnancy in women who had had one kidney removed on account of tuberculosis. Pinard, Pousson, and Hartmann reported experiences in this line, the total on record, according to them, being now 113 cases in which an operation on the kidney for tuberculosis or other cause was accompanied or followed by a pregnancy. In the thirty-five cases in which the operation was done on the pregnant woman, the pregnancy did not seem to be affected in any way and it did not render the prognosis of the kidney operation any more serious. In seventy-four other cases the women became pregnant after the nephrectomy. With the exception of one woman who died from eclampsia and another from renal insufficiency during the puerperium, the single kidney answered every purpose, although it was itself diseased in a few cases and delivery had been difficult in a few others on account of contracted pelvis or other cause. In three cases the pregnancy followed nephrotomy; it terminated in abortion in one case but the other patients had two and three normal pregnancies. In another case a normal pregnancy followed bilateral decapsulation of the kidney. The conclusions were that even when the kidney has been removed for tuberculosis, if the urine is free from bacilli, marriage may be permitted to girls. Pousson stated that fifty-nine out of sixty-five women on whose kidneys he had operated have passed through a normal pregnancy since and some three pregnancies. In seven others there was abortion. In every instance the puerperium was free from complications, and most of the women could nurse their children, one becoming a professional wet-nurse. The children were all healthy at birth and to date, except that one has died of whooping-cough and another at the age of 15 months of tuberculous meningitis."

CASE OF PAINLESS LABOR

The patient is 27 years of age. She is five feet two inches in height and her usual weight is about 100 pounds, although at one time she attained 116 pounds. The family history is negative, as is her medical history save for scarlet fever without sequelæ, and for appendicitis six or seven years ago with an interval operation. The menstrual history is of no especial interest.

Five years ago she gave birth to a six pound child after an easy labor of three or four hours.

The history of the last pregnancy, which terminated in a painless labor, gave her last period October 22, 1909. She states that she felt life at 3½ months. For the first four months there was much nausea and considerable loss of weight. In the latter months of pregnancy there was considerable gaping of the labia, together with a cystocele rectocele. There was marked diastasis of the abdominal recti. The head was found to be engaged in the pelvis the 21st of May in her seventh month of pregnancy in R. O. P. The pelvic measurements were: interspinal 22 cm., intercristal 25 cm., intertrochanteric 30 cm., B. D. 20 cm., C. D. 12 cm., bi-ischiatic 10.5 c. m., antero-posterior of the outlet 11.5 c. m. During the last month of pregnancy the patient continuously complained of a heavy feeling — as she stated: "as if things were coming out." On the morning of July 24th, there was considerable vaginal secretion. At noon it became blood-tinged and she entered the Michael Reese hospital at 2 P. M. Although the patient stated that she experienced no pain or any more discomfort than she had had for some months, yet distinct contractions lasting 40 seconds, and recurring at five minute intervals were perceptible to the nurses. The cervix was found completely dilated at 7 P. M. with the head at the level of the ischiatic spine. The membranes consequently were ruptured and the patient was instructed to bear down when we perceived evidence of uterine contraction. She found this rather difficult as there was no incentive to muscular exertion from the pain of the contractions, and she stated constantly that there was no pain and merely a sense of heaviness in the pelvis. The head shortly appeared in view and remained in sight for about a half hour and was finally expelled by her muscular exertions aided by the Kristellar's method of expression. Both hands had prolapsed to the side of the cheek. The child was a male weighing 3,500 gms., measuring 53 cm. in length and with the following cephalic measurements: Biparietal diameter 10 cm.; S. O. B. 10.5 cm.; O. F. circumference 37 cm.

This case is of the greatest interest to me on account of the most unusual clinical manifestations in a woman of the better class of society who is undoubtedly of a nervous type.

DISCUSSION

DR. CHARLES E. PADDOCK: The specimen from the first case seems to present microscopically conditions which we find in other toxæmias of pregnancy. I would like to know what was found microscopically because I cannot see how one can make a diagnosis of eclampsia without such an examination.

DR. WM. B. FEHRING: Was any examination made of the central nervous system in the case of eclampsia? In the case of painless labor, was there any history or symptom of tabes?

DR. J. C. WEBSTER: I remember one case of painless labor which occurred at a ball in Scotland. In the interval between dances, a lady sitting on a chair suddenly discharged a six months fœtus and placenta. Her physician said that she was entirely unconscious of any pain at the time.

I knew of another case where a full term child was born when the woman got up in the night to urinate. Such cases have been reported in quite considerable numbers. Painless miscarriages are, of course, quite common. Cases have been reported of babies born during sleep without the woman waking up. I do not remember that I have noticed any recent reports in the literature of this country.

DR. R. W. HOLMES: About ten years ago I had a woman who suddenly began to bleed. On examining her I found the os about half dilated. She had a sensation as though her bowels were going to move. From time to time I would feel the uterus contracting, but she complained of only one pain and that was when the skin was torn as the head passed out of the vulva.

Another case is unique, which explains, to an extent, precipitate labor. The woman's first labor was short and easy. She was in the hospital for about a week or ten days waiting for her confinement. She became tired and wanted to go home, but before allowing her to do so, I examined her and found the membranes bulging down to the perineum, the os half dilated, the head more than engaged, almost on the pelvic floor. I ruptured the membranes, she had one easy pain, and the baby was born. I think that explains most, if not all, cases of precipitate labors; that is, there is a painless dilatation, painless descent of the head deeply into the pelvis, and with one pain the membranes rupture and the child is expelled.

DR. FRANK STAHL: Dr. Lynch's interesting cases recall some of my own experiences with cases of painless labor. One case especially was that of a primipara. The progress of her labor at first seemed to be progressing rather slowly, when I suggested that she walk about to encourage dilatation. This continued for quite a long period without any manifestation such as would be produced by the usual painful, bearing down experiences. Examination showed, however, that dilatation and descent was progressing very favorably. I encouraged her to walk about, and after a little time I was surprised to hear her call out that the baby must be coming. In assisting her to lie down, the head was quite three-fourths delivered before she gained the reclining position; the rest of the body immediately followed. The surprising thing about the labor was the dilatation of cervix and perineum with delivery of the child without the slightest rupture; also, the absence of pain throughout the whole labor. When it came to decide where to deliver the second and third labor, I suggested the hospital for fear of precipitate labor because of absence of the usual signs of bearing-down and pain. As Doctor Lynch has well said, many cases of antemature labor are often terminated in painless labor manner.

DR. LYNCH, closing: The woman who had the painless labor was of a distinctly neurotic type. Her kneejerks in the middle of the pregnancy were extremely active. She is now in excellent health. My experience with these cases has been as Dr. Holmes described. I have seen a large number of babies born with one expulsive pain. My obstetrical experience was inaugurated in a clinic where a large proportion of the patients were negroes.

In the eclampsia case we did not examine the brain. We bled the woman slightly, and shortly after this I did a lumbar puncture. A very little fluid was obtained, and on examination it showed very few cells. There was complete suppression of urine during the day, and a specimen obtained by catheterization was only 30 cc. in amount, with a high nitrogen content, all kinds of casts and red blood cells. It was interesting that the ammonia-nitrogen constituted sixteen per cent of the total. Sections were made from a number of the organs, practically all, except the thyroid, and they all showed parenchymatous degeneration and subserous hæmorrhages. The kidney was typically involved, and I am one of those who believe that there are distinct and typical eclamptic changes which can be diagnosticated. These are constant and are simulated by no other

condition. In the liver there were areas of necrosis of considerable extent not limited to the periportal spaces, about which were leucocytes and a considerable extravasation of blood. We were unable to find thrombotic processes in the smaller blood-vessels. On microscopic examination, we found no thrombi in the larger vessels of the liver, or in those which could be traced by sight.

Dr. W. A. Newman Dorland read a paper entitled "A Consideration of Renal Anomalies, with the Presentation of Unique Cases," which appears in this issue. (See p. 303.)

Dr. Channing W. Barrett read a paper entitled "The Sigmoid in Relation to Pelvic Disease," which is published in this number. (See p. 320.)

DISCUSSION

Dr. J. Rawson Pennington: In the paper which I read three years ago, to which the doctor referred, I said nothing definite about the genital side of the question, and for that reason he seems to think that I was a little too conservative. I said then, and I still claim, that the sigmoid is a very important factor in many cases of pelvic disease. This can readily be seen if one studies the relationship between the genitalia and the sigmoid and rectum. In examining women who have rectal or sigmoid trouble, you will often find that they also have uterine trouble, and in many of these when the bowel condition is removed, the uterine disease disappears.

I believe that when the sigmoid is filled with feces continually, the uterus may be crowded down into the pelvis and held there. Normally the position of the uterus is that of suspended mobility in an anteverted state. The normal position of the hand is by the side of the body, but if you fix it there, it becomes congested. The same thing is true of the uterus. When held fixedly in any position, it will become congested and in due course of time will be found to be pathologic.

When these patients come to you, it is very important that you examine them thoroughly by rectum as well as by vagina. In that way only can you hope to make a diagnosis of any sigmoid or rectal trouble, which may be reponsible for the apparent uterine disease.

Dr. Emil Ries: The question of the importance of the sigmoid in the production of pathologic conditions in adjacent or neighboring organs is, I think, based entirely on our knowledge of actual pathologic conditions in the sigmoid. These conditions I would not call congestion; I would like to speak of something more definite.

Our knowledge of these troubles dates from the work of Graser, who was the first to give a complete and satisfactory exposition of the formation and course of the diverticula.

I have here some sections. They came from a man on whom I had to operate for an acute condition due to the diverticula. The first specimen shows a diverticulum, with the formation of small cysts, giant cells, with foreign bodies, etc. There was a very active and dangerous pathologic process going on in that sigmoid.

We can only diagnose these diverticula when they make acute trouble, when there is a perforation of the diverticulum, either into the free peritoneal cavity or into the mesosigmoid; sometimes when there is a slow leak or perforation or ulceration, and proceeding from there inflammatory infiltration of the neighboring tissue, the diagnosis is also possible. As long as we do not have these secondary conditions, I know of no way of making the diagnosis of the existence of a diverticulum. When you make postmortems and examine the sigmoid of one body after another you find diverticula in as high as twenty per cent. These diverticula are always present in numbers. In this particular instance I resected the sigmoid in the presence of an abscess due to perforation of a diverticulum, and there are dozens of these diverticula in that sigmoid. The patient had an extensive mesosigmoiditis, thickened appendices epiploicæ, and an abscess. When you find a thickened sigmoid which you can palpate from the outside, in many cases you may have a suspicion of diverticula, but it takes considerable courage to open the abdomen on such a suspicion and resect the sigmoid, although that would be a prophylactic for further trouble.

It has been mentioned that the appendices epiploicæ should not be cut off without taking care of the lumen, as we do in appendicitis, after removing the appendix. I do not know whether that is necessary. Such a diverticulum has an extremely small lumen. If you cut if off and tie a ligature around it, I think it is as safe as when done with the appendix. Where you find numerous diverticula, the proper treatment is not to remove these appendices epiploicæ, but to resect the sigmoid, because only in that way can you remove the danger.

These diverticula are present not only on the free surface of the sigmoid, but their ends may dip between the folds of peritoneum forming the mesosigmoid and there may be extensive inflammatory conditions without anything acute showing, and where you get a chronic mesosigmoiditis it leads to a shortening and kinking of the sigmoid with all its consequences. It is easy to imagine

and easy to prove that this inflammation does not stop there, but that it extends down behind the peritoneum into the broad ligament on the left side, and it may be the origin of many cases of left-sided trouble. The paper Dr. Pennington read concerned perisigmoiditis and not mesosigmoiditis. His pictures show bands of adhesions. That is not a condition originating in diverticula, unless you can prove that the trouble started in the appendices epiploicæ.

There is one thing of interest to the gynecologist and that is the comparatively frequent mistake made between abscess due to perforating diverticula and left-sided tumors. Before we knew anything of diverticula I operated in such a case under the diagnosis of probable tumor of the left ovary, suspecting a malignant tumor with more or less gangrene because the patient had a temperature. There was an abscess behind the sigmoid. It was undoubtedly a case of perforated diverticulum, and since then a number of such cases have become known.

What Dr. Barrett said about the attention to be paid to the mesosigmoid is excellent, and the more you will do this the more you will find these pathologic conditions. The change which is produced in the normal anatomy of the pelvic organs by these changes in the mesosigmoid are surprising. The mesosigmoid, in consequence of the bands of cicatricial tissue which follow inflammation of these tissues, forms remarkable recesses and cavities in which the end of the tube, and sometimes the ovary, dips and becomes adherent, and it is hard to find them unless you follow them closely.

Mesosigmoiditis also predisposes to volvulus, and this may sometimes follow operations which in other respects have been perfectly well done. If you find these bands, it is wise to tear them off so as to give the sigmoid as much mobility as possible. A shortened sigmoid with cicatricial bands is not favorable to the functions of a normal sigmoid. These bands are not very vascular. They can be torn easily without hæmorrhage and so as to give the sigmoid its normal freedom and mobility.

Dr. Barrett, closing the discussion: Contrary to Dr. Pennington's statement I have not undergone a change of mind since discussing his paper. I then thought and still think that he laid too little stress upon pelvic disease other than of sigmoidal origin. I would agree with him in that there is considerable pathology in the pelvis that has its origin in the pathology of the sigmoid. I also believe that there is a great deal of pathology of the sigmoid which has its origin in the genital tract. I agree with him in that a fixed uterus in any position is bad; but a fixed sigmoid is also bad, and the fixation of either may arise from infection from either.

One theory of the origin of these diverticula furnishing opportunity for the diverticulitis of Graser is that the musculature of the bowel is weak, and that there is an obstruction to the outflow of the sigmoid contents. The musculature becomes distended and thin and the mucous membrane is pushed out between the muscle fibers. This occurs not only at the free portion of the sigmoid, but at the mesosigmoid; in fact, it is more apt to occur at the latter point.

With regard to dealing with the appendices epiploica or sacculations, I said that we should deal with these not merely as though we had a blood supply to control but as though there was a possible lumen. We do not say that they can not be clamped and tied. The appendix can be clamped and tied with safety; but it is usually tied with a permanent ligature. In the case of the appendices epiploica, we have been inclined to deal with them as though we had only hæmorrhage to stop, tying them with a very fine catgut. If one of these diverticula presented there this would be unsafe. In fact one of these appendices may be an enlarged diverticulum which may contain quite large enteroliths.

One difficulty which may contain quite large enteroliths, in a radical way, is that it sometimes presents the condition in which there is a very short mesentery or mesosigmoid, with a more or less fixed condition of the rectum and transverse and descending colon, so that it might be difficult to bring these structures together. If there is a long, loose mesosigmoid, we can remove the sigmoid and bring these structures together easily. Under some conditions it would be difficult to deal radically with these patients, especially under the conditions named. Some of these patients improve markedly following the establishment of an artificial anus. The rest the sigmoid gets then allows it to recover more quickly.

ABSTRACTS OF CURRENT LITERATURE

DEPARTMENT OF SURGERY

UNDER THE CHARGE OF

FREDERIC A. BESLEY, M. D.

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A Comparative Study of the Histology of the So-called Hypernephromata and the Embryology of the Nephridial and Renal Tissues. L. B. WILSON. *Journal of Medical Research*, vol. xxiv, No. 1, January, 1911.

This study is based upon forty-eight kidney tumors, which we have been accustomed to call hypernephromata. Thirty-four of the tumors were removed at operations in the Mayo Clinic, and fourteen were unreported cases gathered from outside sources. In pursuing this study, the author became more and more impressed by certain discrepancies between the facts observed, and the Grawitz' hypothesis of their origin from adrenal rests. This impression was further strengthened by a review of the literature, and in particular by an excellent article by Stoerk, which fully established in the mind of the author many of his previous doubts. In fact, this paper by Stoerk arrays in a convincing manner a mass of facts and arguments against Grawitz' hypothesis, while at the same time adducing much evidence to show the tumors to be of renal origin. We must admit, however, that there remain other characteristics of the tumors which still appear incompatible with our conception of adenomata or carcinomata derived from kidney tubules. In an attempt to clear up these points, the author recently reviewed, both in the literature and in the tissues, certain phenomena of the embryological development of the nephridial and suprarenal tissues.

As suggesting the origin of these tumors from adrenal rests he cites the views of Grawitz.

1. *The seat of the tumor.* They are situated immediately beneath the kidney capsule, a point frequently invaded by suprarenal cells.

2. *The character of the cells.* They are absolutely different from the epithelium of uriniferous tubules.

3. *The fat content of the cells.* Fat is normally absent from the renal epithelium but frequently present in the suprarenal.

4. *Encapsulation of the tumor.* The capsule is similar to that which is found around "suprarenal rests" within the kidney, but which are not changed into tumors.

5. *Relation of the tumor cells to the surrounding tissues.* The cells which are analogous to the suprarenal cortex are disposed in more or less regular cordons, while in the central region of the tumors there is evidence of fibrous tissue resembling the medulla of the suprarenals.

This hypothesis of Grawitz was accepted and confirmatory evidence supplied by a host of observers during the next quarter of a century. About the only critic of note during this period was Sudeck, who held that the Grawitzian tumors had nothing to do with adrenal rests, but were renal adenomata. He described their development from an atypical proliferation of the epithelium of the kidney tubules and noted that the tumor consists largely of cells which are not separated from the wall of their supporting capillaries by connective tissue. Sudeck's views received little support, though from time to time observations were recorded which tended to throw doubt on Grawitz' hypothesis. One of these was that of Greer and Wells, who in a careful chemical examination of hypernephromata, failed to find any trace of adrenalin. Adami, in discussing broadly the classification of tumors on an embryogenetic basis, states the opinion that the two organs (adrenal and kidney) are embryogenetically so closely related that *tumors arising from homologous tissue must possess closely related characters.* For all this order of tumors, the transitional adenomas, carcinomas of adrenal, kidney, ovary, and testis, he suggests the term *mesothelioma.*

Stoerk, who basis his statements on "many years of study of more than 120 specimens of renal tumors from operations and autopsies" begins his paper with a statement of his support and extension of Sudeck's views. He pertinently asks: "Why do Grawitzian tumors always develop from the kidney and never from the adrenal? Why do tumors developing on the adrenal gland always look so different from Grawitzian tumors? Why, in the face of the legion of adrenal rests found in the liver,

is there not a single case of hypernephroma of the liver established?"

Stoerk's summary is as follows:

1. Between hypernephrogenic and nephrogenic tumors no kind of convincing agreement exists.

2. The different forms of Grawitzian tumors are shown histologically as varieties of one and the same fundamental type.

3. The Grawitzian tumors of the kidney are of renal origin.

4. The tumors under discussion should be designated adenomata, papillary cystomata or carcinomata of the kidney after the Grawitz type.

The personal observations of the author, both from an anatomical and histological standpoint, fully confirm the first two of Stoerk's conclusions. With regard however, to his third conclusion, that these tumors of the kidney are derived from convoluted tubules, he states that he is not prepared to agree.

In a long discussion of the various phases of this question, the author presents many more or less valid objections to both Grawitz' and Stoerk's hypothesis of the origin of these tumors, and then asks the question, "Are they of Wolffian origin?" The very frequent inclusion of remains of the Wolffian body within or under the kidney capsule might lead one to expect the much more frequent development of tumors from this source than from the suprarenal.

The following general conclusions are drawn from this study:

1. Most, if not all, so-called "adrenal rests" are probably of Wolffian origin.

2. There is almost no evidence, embryological or histological, in support of Grawitz' hypothesis that the so-called hypernephromata have their origin in adrenal rests.

3. There is much evidence that the so-called hypernephromata do arise (according to Stoerk's hypothesis) from proliferations of the adult secreting epithelium of the convoluted tubules.

4. There is much evidence that the so-called hypernephromata do arise from islands of nephrogenic tissue (primitive renal blastema). Such tissue is sometimes present in the adult kidney and appears capable of forming tumors of non-infiltrating mixed cordon, tubular, papilliform, and sarcoma type characteristic of the so-called hypernephromata.

GEORGE E. BEILBY.

The Treatment of Ectopia Vesicæ; Converting the Cecum into Bladder and the Appendix into Urethra (Zur Behandlung der Blasenectopie; Umwandelung des ausgeschalteten Cecum zur Blase und der Appendix zur Urethra). DR. M. MAKKAS BONN. *Centralbl. f. Chirurgie*, 1910, No. 36.

The author cites a case of ectopic bladder in which he made use of the cecum as a reservoir and of the vermiform appendix as urethra. The patient was a twelve year old girl, mentally deficient, with typical ectopia vesicæ and vaginal atresia.

First operation, May 12, 1910. Incision made through right rectus. A portion of the cecum 8 cm. long was completely excluded and both ends sutured tightly closed. This could be brought readily to the middle line of the abdomen. A lateral anastomosis was made between ileum and colon transversus. The vermiform appendix, about 7 cm. long, was brought through a buttonhole in the abdominal wall just below the lower border of the incision; its distal end removed and the mucosa sutured to skin. The laparotomy wound was closed in three layers. After the tenth day the cecum was irrigated through a Nelaton catheter passed into the appendix lumen. At first the capacity of the new reservoir was 120 cc.; however, it soon diminished to 100 cc. and remained constant. The irrigating fluid contained mucus.

Second operation took place on June 18, 1910. It consisted of freeing the ectopic bladder from the surrounding tissues and the ureters for a distance of 4 or 5 cm. The latter was accomplished by blunt dissection and as much periuretheral tissue as possible was included to insure the proper blood supply. Abdominal incision was made in the middle line and the cecum was found adherent to the parietal peritoneum. The mobilized bladder was brought to the lower pole of the cecum without tension or kinking of the ureters. The posterior wall of the cecum was then opened as near as possible to the lower pole and a portion of the bladder somewhat larger than a dollar, adjacent to the ureteral orifices, was implanted into it. A Nelaton catheter was left in the appendix opening. The child recovered quickly from the operation and the urine passed unhindered through the new urethra (appendix). The new reservoir was irrigated frequently each day, and after the eighth day the catheter was closed with a glass stopper which was removed every two or three hours in order to empty the new bladder. The capacity at first was 100 cc. but during the next four weeks increased to 300–325 cc. at which time the condition of the child was as follows: Out of bed, no fever. Every three or four hours during the day the bladder must be emptied by removal of glass stopper. At night, sleep undisturbed. When the bladder is full and catheter is removed the urine does not escape; although this continency is not absolute because movement on the part of the patient causes the urine to escape drop by drop. Daily quantity 1,000 to 1,200 cc. Urine cloudy from mucous flocculi. No albumen. Sediment contains a fair amount of leucocytes and epithelium. J. S. EISENSTAEDT.

Tuberculosis of the Kidney (Über Nierentuberculose). PROF. BARTH. *Deutsche med. Wochenschrift*, No. 21, May 25, 1911.

Barth after a long experience with renal tuberculosis states the following conclusions:

1. Certain kidney excreting tubercle bacilli, and those having encapsulated tuberculous foci, may possibly heal spontaneously. However, this may never be expected in those cases showing definite pyuria with abscess formation already present in

the kidney. This is true because observation teaches that in such cases the process will become disseminated both by the lymph stream and by the contaminated urine to the remainder of the urinary canal. The healing of such cases in which he admits the possibility, may only be determined by repeated ureteral catheterization. All other signs are deceptive and worthless.

2. Nephrectomy done for unilateral renal tuberculosis, after determining normal function in the opposite kidney, is an operation practically devoid of danger.

3. As long as the disease is confined to one side; nephrectomy offers an excellent prognosis for permanent cure from tuberculosis, as far as concerns the urinary system. However, if the bladder is already affected a permanent cure may be expected in only one-quarter of the cases. About the same number die in the first year of tuberculosis, and the remainder have a very much better prognosis as to duration of life and condition of health.

4. A distressing sequela of bladder tuberculosis, even after complete healing, is polikiuria, especially at night.

5. Every case of renal tuberculosis should come to nephrectomy, if possible, before the bladder is involved.

6. So-called "open" tuberculosis of the kidney can in its incipiency and early stage only be diagnosticated by ureteral catheterization, which procedure, as well as a complete bacteriologic examination, should be made in all cases of obscure pyuria or "bladder catarrh." J. S. EISENSTAEDT.

Additions to the Etiology of Inflammatory Stenosis of the Large Intestine . (Zur Kentniss der Ætiologie der Entzündlichen Mastdarmstenosen). DR. ALFRED EXNER. *Deutsche Zeitschrift für Chirugie*, cix, 3-4, April, 1911.

From an etiological standpoint in the causation of strictures, one must take into consideration the following diseases:

First, dysentery, the most frequent cause, secondly, tuberculosis, then injury through injections in the rectum, coprostasis and pressure necrosis of the mucous membrane during childbirth, when the head remains fixed for a long time in the small pelvis.

However, in spite of the foregoing causes, undoubtedly the two chief causes of strictures of the rectum are lues and gonorrhœa.

The author cites a number of cases in this report from the last two named causes, and divides them into two groups.

Group one, which comprises the largest number of cases, in which the Wasserman reaction is negative. In connection with these cases, the histological findings are given in detail, showing the presence of granulation tissue, round cell infiltration, and the presence of large numbers of plasma cells.

The second group of cases comprises those in which the Wasserman reaction is positive. In this group however, the pathological findings are practically identical with those in the previous group, showing that in cases even in which a luetic infection is present, the cause of the stricture of the rectum is not luetic. The author sums up this article in the following words:

In the overwhelming majority of cases of inflammatory stenosis of the large intestine the cause is gonorrhœa, not excepting those cases in which the Wasserman reaction is positive.

FREDERICK G. DYAS.

The Surgical Treatment of Benign Chronic Disease of the Colon, with a Special Regard to Ileo-sigmoid Anastomosis (Über die chirurgische Behandlung der benignen chronischen Colonerkrankungen, besonders mittels Ileo-sigmoideoanastomose). B. FLODERUS. *Nord. Med. Arkiv.*, 1911, afd. 1 (Kirurgi), Festskrift for J. Berg, Nr. 13.

Floderus advises that ileo-sigmoid anastomosis be performed where the symptoms in the colon are due to local disease. This should be performed before the condition in the colon has reached a severe degree. He reports two new cases and collects the literature on same.

The Reno-renal Reflex (Über den Reno-renalen Reflex). C. D. JOSEPHSON. *Nord. Med. Arkiv.*, 1911, afd. 1 (Kirurgi), Festskrift for J. Berg, No. 17.

The reno-renal reflex has two distinct methods of manifestation, the reflex pain and the reflex anuria. The reflex pain is most often the result of ureteral stone, but may be due to tuberculosis of the kidney or even to hypernephroma. The pain reflex occurs in only about one per cent of the cases of kidney stone. Josephson does not think that the frequency of the occurrence justifies the statement that there is a very close nervous connection between the two kidneys.

The reflex anuria is due to the same causes as is the reflex pain, but the two are not coexistent. There is some question whether reflex anuria can occur if one kidney is entirely normal. In most cases the kidney opposite the seat of primary disease shows a more or less marked degeneration. It seems probable, however, that anuria can occur one kidney being perfectly normal. To make diagnosis of this condition, all the methods of diagnosis are necessary. The diagnosis once made, interference is indicated. Some operators wait as long as five days before interfering.

ABSTRACTS OF CURRENT LITERATURE

DEPARTMENT OF OBSTETRICS

UNDER THE CHARGE OF

C. S. BACON, M. D.
HELIODOR SCHILLER, M. D.
HERBERT MARION STOWE, M. D.
C. G. GRULEE, M. D.

Significance of Cystoscopic Examinations in the Diagnosis and Treatment of Pyelitis during Pregnancy (Die Bedeutung der Zystoskopie für die Diagnose und Behandlung der Schwangerschafts pyelitis). A. COLMAN. *Deutsch. med. Wochen.*, No. 12, 1910.

Colman states that there are various dangerous renal conditions complicating pregnancy which demand energetic surgical interference, e. g., pyonephrosis causing a large tumor, multiple abscess formation, etc. However, in those cases in which the pathology is confined to the mucous surfaces, radical surgical procedures are as often out of place as the mechanical interruption of pregnancy.

Ureteral catheterization clears up in many cases doubtful diagnosis and permits a differentiation between cholecystitis and appendicitis, and the lesions of the urinary tract. In those cases in which high temperature, thick purulent urine, and stormy symptoms are absent, catheterization of the ureters is often the first thing to put one on the right track. Through its use the too common diagnosis of cystitis of pregnancy may be corrected, and disease higher up in the tract be discerned. He calls attention to a case of a pregnant woman who had long been treated for cystitis and only after catheterization of the ureters was a diagnosis of pyelitis made. Pyelitis does not occur only in the latter months of pregnancy, and Colman recites a case with very severe symptoms in the third month, who after internal treatment made a complete cure. He states from his experience that pyelitis is not confined to one side and that the right, as is usually asserted. He found half of his cases were bilateral. On irrigation of the renal pelvis all cases were markedly helped. The relief is as rapid as is noted on the incision and evacuation of an abscess. Pain, fever, and general symptoms, as well as the danger of interruption of pregnancy, are all allayed.

A complete cure, however, is not effected by irrigation, as the pyelitis of pregnancy is closely analogous to kidney of pregnancy and a true recovery does not take place until delivery. Colman recommends the washing out of the renal pelvis in those cases in which the usual internal treatment has proven insufficient. J. S. EISENSTAEDT.

A New Operation for Radical Treatment of Flat Pelvis. ERNEST W. HEY GROVES. *Proc. Roy. Soc. of Med.*, 1911, iv, 264.

The principle of the operation is as follows: The horizontal ramus of the pubis is completely divided on both sides. The ascending ramus of the ischium is partly divided on both sides, so as to allow of the ready fracture of this bone. The whole of the pubic bones are then displaced forward until their posterior surfaces catch against the anterior surfaces of the parts of the rami of the pubes which remain in position. The bodies of the pubic bones remain permanently in this position, and the pelvis has its conjugate diameter increased by three-quarters of an inch.

It will be convenient to consider the various steps of the operation in detail:

1. The division of the rami of the ischia: The patient is placed in the lithotomy position and the ischial tuberosities defined. A small stab is made over the ramus of the ischium, just in front of the tuberosity, and through this the bone is partly sawn through with an Adams's saw. This is best done on the outer surface of the bone, so as to avoid any risk of injury of the internal pubic vessels and nerve which lie with the internal obturator muscle on its deep surface. This is done on both sides, the wounds closed each by a single stitch, and dressed with a collodion dressing. The patient is placed in the supine position for the remainder of the operation.

2. The division of the horizontal ramus of the pubis: An incision one and one-half inches long is made over the inner end of Poupart's ligament and the soft parts divided down to the external abdominal ring. The inguinal canal is opened up by slitting the aponeurosis of the external oblique, and its contents displaced upwards. The fascia forming the posterior wall of the canal is cut in the line of the original incision, and the pubic ramus thus exposed. The peritoneum is readily separated from the back of the bone with the finger tip. A search is made for the presence of any accessory obturator vessels, and if these are present they must be divided between two ligaments. The pubic ramus is then sawn through as far outward as the position of the femoral vessels allows. This is done

by an Adams's saw held in the plane of the brim of the pelvis, the point being directed backwards and as much outwards as possible. This oblique section of the bone is the essential point in the operation, because it provides for the locking of the bones in their new position.

3. The displacement of the bodies of the pubic bones forward: The two pubic bones are now to be brought into their new position. This can generally be done by the mere traction of the two index fingers, but it is accomplished better by the help of a pair of instruments like spanners which I have had made for the purpose. Poupart's ligament will require to be partly divided on both sides. Then the spanner is slipped into the wound and over the body of the pubic bone on both sides. Very moderate pressure on the handles of these instruments then serves to lever the cubic bones forward, the tendency of the bones to jam against the rami being overcome by pressing the handles of the spanners slightly outwards, so as to bend the pubic bones inwards at the symphysis. When the bodies of the pubic bones have cleared the rami they are bent outwards, and they then rest in such a position that they cannot slip back. In the carrying out of this part of the operation the ischial rami fracture at the place where they have already been partly divided. The operation is concluded by a suture of the inguinal wounds.

From an anatomical standpoint no important structures are likely to suffer from this operation nor are the bones displaced so much that firm union cannot take place.

From a clinical standpoint there are three notable advantages: (1) The gain in the true conjugate is three-fourths to one inch; (2) The ring of the pelvis is not opened laterally, so that there is no injury to the sacro-iliac joints; (3) The result is a permanent enlargement of a flat pelvis.

Operations on the Kidney and Pregnancy (Operations sur le Rein et Grossesse). POUSSON. *Annales de Gyn. et d'Obstet.*, Oct., 1910.

This paper was presented before the gynecological section of the French National Congress of Gynecology, Obstetrics, and Pediatrics, at Toulouse, and is reported in abstract only. The author reports the results in sixty-six cases of pregnancy where nephrectomy had been done. Thirty-two of these cases were operated upon for tuberculosis, ten for nephrolithiasis, thirteen for pyonephrosis and hydronephrosis, two for ureteric fistula, and in nine cases the indications were various. In subsequent pregnancy, but seven of these women miscarried, three of the tuberculous group, one of the nephrolithiasis group, and one of the two operated upon for ureteric fistula. Fifty-nine went to full term after uneventful pregnancies, eight of them having two children, and five becoming pregnant three times. The majority were able to nurse their children, one even serving as wet-nurse. Of the tuberculous group three patients died some time after labor. Sixty-one are still alive and well, the remaining two dying a considerable time after the puerperium, of conditions not due to pregnancy.

Pousson argues that nephrectomy is not a contraindication to marriage or pregnancy, but emphasizes the importance of analyzing the urine in order to keep informed regarding the conditions of the other kidney.

Hartman offered details of twenty-four other cases of nephrectomy where pregnancy had followed fortunately, and cited twenty-eight nephrectomies during pregnancy, twenty-two of which went to full term without further trouble. Embolism and eclampsia was the cause of death in the two fatal cases. Of five nephrectomies, four went to term, one dying after miscarriage.

CAREY CULBERTSON.

Remarks on the Operative Treatment of Primary Sterility (Bemerkungen über operative Behandlung der primaren Sterilitat). A. L. FONSS. *Nord. Med. Ark.*, 1910, afd. i (kirurgi), h. 3 and 4.

The material consisted of 103 cases of which 52 became pregnant after the operation. Sterility of the male was not looked for but is thought to have been present in one-fourth to one-third of the cases.

Twenty-two cases of perimetritis gave results in six; small changes in the ovaries did not influence the results. Of five cases of endometritis fungosa only one became pregnant.

Results may be tabulated as follows:

1. VULVA AND VAGINAL OPERATIONS

Cause of Intervention	Cases	Pregnant afterwards
Vaginismus	30	18
Persistent hymen	6	3
Transverse vaginal rupture	1	1

2. UTERUS

Cause of Intervention	Cases	Pregnant afterwards
Dysmenorrhœa	55	24
Other causes	11	6

Fonss favors Pozzi's operation.

BOOK REVIEWS

MANUAL OF CYSTOSCOPY. By J. Bentley Squier, M. D., and Henry G. Bugbee, M. D. New York: Paul B. Hoeber.

This small book of 117 pages fills a long felt want for the beginner in the study of cystoscopy. Only the most important theoretical sides of cystoscopy which are essential to a working knowledge are considered. To quote from the author's preface: "The statements are concise and the technique described in detail is that which we have found most satisfactory after a thorough trial of other methods." While the essentials of a working knowledge of the instruments are set forth, the book has been kept within small compass.

The book is written in a very systematic manner. The illustrations are good and the colored plates of both the normal and pathological bladder are to be highly commended.

A brief history of cystoscopy is given.

In describing the technique of cystoscopy of the normal bladder, the authors consider the sterilization of the cystoscope, position of the patient, sterilization of the patient, and irrigation of the bladder.

Variations in the color of the mucous membrane, blood supply, internal vesical sphincter, the air bubble, motions of the bladder, the ureteral orifices, trigone and shadows in the bladder are briefly considered under the cystoscopic pictures of the normal bladder.

All of the commoner pathological conditions of the tuberculous cystitis, hypertrophy of the prostate, calculi tumors, and foreign bodies are briefly and plainly presented, and are illustrated in colors.

Both methods of urethral catheterization are dwelt upon as well as the difficulties commonly met with in everyday work.

The book is a manual and as such completely fulfills the objects of the authors, who state that "the book has been written in response to the repeated applications from our students for a short practical work on cystoscopy."

HERMAN L. KRETSCHMER.

TEXT-BOOK OF OPERATIVE SURGERY. By Dr. Theodor Kocher. Third English edition. Authorized translation from the fifth German edition by Harold J. Stiles, M. B., F. R. C. S., and C. Balfour Paul, M.B., F.R.C.S. New York and London: The Macmillan Company.

The appearance of a new edition of Operative Surgery by Theodor Kocher should be the occasion of more than ordinary passing comment. A careful perusal of the work leaves one somewhat confused and with the sense of being unable to accurately appreciate its contents. Many of the chapters are not surpassed in any other volume dealing with operative surgery which is available at the present time. On the other hand, other chapters have evidently missed the master hand of Kocher. Again those familiar with the earlier editions of Kocher will remember the large full page pictures which illustrated little or nothing. These, unfortunately, have been used in the present edition.

American surgeons will probably miss many of the newer details associated with American surgical procedures, such as are found in the works of Crile, Murphy, the Mayos and others; while those chapters which have evidently received the personal attention of Kocher, those dealing with gall-bladder surgery, the thyroid, and other important sections, are dealt with in a masterly manner and serve to redeem the book and place it upon a firm foundation in the English literature. In other words the everyday surgeon looking for a text-book of operative surgery will at times be disappointed. The surgical specialist will turn with repeated frequency to the chapters which have received the stamp of Kocher's personal work and which detail the results of his investigation and his wide and well founded deductions made from surgical data. One who has advanced in surgery where he wishes the individual ideas and opinions of various surgeons, must of necessity have the new edition of Kocher in his library, and all of those who are interested in surgical problems will find it a valuable addition, for when all is said and done Kocher is Kocher.

SPEZIELLE CHIRURGISCHE DIAGNOSTIK FÜR STUDIERENDE UND ARZTE. By Dr. F. de Quervain. Third edition. Leipzig: F. C. W. Vogel, 1911.

The third edition of de Quervain's Special Surgical Diagnosis which has just been published merits well the commendation of being one of the most valuable contributions to surgical literature which has appeared in late years. The earlier edition was noted in these pages and attention was drawn to the general excellence of the volume. The present edition of over 700 pages is a further amplification of the subject without in any sense being a padding. Every page is filled with surgical suggestions. The clearness with which the matter is set before the student and the conciseness with which it is stated, the reviewer has not found in any other like volume. The book should be in the library of every surgeon who reads the German language.

PLASTIC AND COSMETIC SURGERY. By Frederick Strange Kolle, M.D. New York and London: D. Appleton & Company, 1911.

This volume by Kolle comprises 500 pages and profusely illustrates the various technical procedures incident to this work. It is an excellent résumé of the various methods used under particular conditions, each method being described in a simple, concise manner and yet with such detail that the surgeon experienced in operative work will have no difficulty in following the steps. Being upon a subject which is so interesting to all surgeons, the book should be gratefully received by those who are often called upon to treat such conditions and who have not adequate knowledge of the different methods.

Besides the full description of the ordinary procedures found in text-books upon rhinoplasty and cheiloplasty, the chapter upon hydrocarbon protheses is an excellent one, detailing the advantages and disadvantages, as well as giving a full discussion of, the paraffine treatment; in fact, it is one of the most satisfactory chapters in the book. There is also an excellent discussion of cosmetic rhinoplasty describing the various methods not ordinarily discussed in surgical text-books.

The author is to be congratulated upon the conciseness with which he has handled his material and the excellent review he has given the entire subject.

GENERAL SURGERY. The Practical Medicine Series, Vol. II. Edited by John B. Murphy, A.M., M.D., LL.D. Chicago: The Year Book Publishers.

The present volume of this yearly review of surgery under the editorship of Dr. Murphy maintains a standard that has been set in the past for the excellent review of all of the essential facts that have been brought out in the preceding year. As each of these volumes appears, it is brought home more and more to the reviewer the general excellence which have been maintained. The editorial comment by Dr. Murphy adds greatly to the value of the book.

ATLAS OF MICROSCOPIC DIAGNOSIS IN GYNECOLOGY. With preface and explanatory text by Dr. Rudolph Jolly. Authorized English Translation, by P. W. Shedd, M. D. London: Rebman Limited, 1911.

The translated form of this atlas by Jolly is in all respects comparable with the original, which was reviewed at some length in these columns last year. The chief part of the atlas, the lithographs, is identical with the original, being from the same plates and are mounted in a similar manner. The text is well prepared and the translation is entirely adequate. The volume, unusually well bound in cloth, presents, therefore, the same characteristics as its original. The lithographs are excellently prepared, the color work is exquisite, but the reduction from the drawings is somewhat too marked, so that cell definition is often not clear. The author, too, is not altogether consistent. Thus, while he recognizes the Hitschman-Adler work relative to the uterine mucosa in the text, he persists in the old classification of endometritis in the drawings, an arrangement that should be obsolete. The greatest defect of the work, however, as was previously pointed out, is that the plates are confined entirely to diagnosis with reference to vagina and uterus only, no part of the work having to do with the tubes and ovaries. Hence, as an atlas of microscopic diagnosis in gynecology, the volume is incomplete and of corresponding value only to the practitioner and student. CAREY CULBERTSON.

ENLARGEMENT OF THE PROSTATE. Its Treatment and Radical Cure. By C. Mansell Moullin, M. D., F. R. C. S. Fourth Edition. Philadelphia: P. Blakiston's Son & Co., 1911.

The author takes up his subject in an exceptionally interesting way, bringing in enough detail to make his work clear, but at the same time not to tire the reader.

The opening chapter on the anatomy of the prostate is well handled. He goes into detail in regards to anatomical association of the male pelvic organs, and their probable functions. In the discussion on prostatic enlargements he enumerates the varieties and conditions encountered, first plainly stating what is meant by the term. From his description one must consider the hard, nodular prostate, at times, as a simple hypertrophy.

As to the causes of prostatic enlargement, there is little known. It is not necessarily a senile affair. Removal of the testes early causes an atrophy of the prostate. Under symptoms the author discusses in detail the variations in the urinary act, and the significance of residual urine, bringing clinical symptoms in relation to the pathological conditions.

In differentiating simple hypertrophy from carcinoma he points out two characteristic findings in malignancy — 1st, acute pains, 2d, the peculiar "stony hardness" of the gland.

He also emphasizes the fact that prostatic enlargement with residual urine soon causes kidney changes.

Under treatment he makes a strong plea for general care — namely — diet and hygiene. He discusses in detail urinary fever, under the topic catheterization giving for its cause the introduction into the circulation either bacteria or their toxins, this being brought about by the abrasion of the urethral or vesical mucous membrane by the catheter, and the subsequent entry of the organisms. Such palliative treatments as catheterization and treatment of symptoms, can at best be only temporary, and quite often increases the severity of the symptoms by introducing septic organisms into the bladder. Under radical treatment he details the technique of both suprapubic and perineal methods, the method pursued depending on the nature of the prostate enlargement. JOHN A. WOLFER.

GOLDEN RULES OF PEDIATRICS. By John Zahorosky. St. Louis: C. V. Mosby Co.

This small volume contains numerous very valuable hints in regard to the care and diagnosis of children's diseases. It is intended for the profession but many parts of it would be equally valuable for the laity. The book is well divided and systematized and the rules given are many of them quite original. Appended to the main volume is a chapter containing prescriptions which will be of much value to general practitioners.

On the whole the book is a unique and valuable addition to pediatric literature.

COLLECTED PAPERS. By the Staff of St. Mary's Hospital (Mayo Clinic), Rochester, Minnesota. Philadelphia and London: W. B. Saunders Company, 1911.

This volume, presenting the collected papers of the staff of St. Mary's Hospital (Mayo clinic), is a beautiful octavo of nearly 700 pages. It does not purport to be an original work on surgery but a collection of papers read by the Mayos and their associates before various medical societies, and published at various times in current medical literature. It is the outcome of a plan by the authors to print the papers for private reference, but at the insistence of numerous members of the medical profession, they were finally induced to place the book upon the market.

The contributors are Henry G. Andrews, E. H. Beckman, W. F. Braasch, H. Z. Giffin, Christopher Graham, Donald Guthrie, M. S. Henderson, E. S. Judd, William C. MacCarty, Alice Magaw, Charles H. Mayo, William J. Mayo, H. S. Plummer, and Louis B. Wilson.

The book includes papers on the alimentary canal, hernia, genito-urinary organs, ductless glands, head and extremities, anæsthetics, technique, and communications on general subjects.

There has been no work in medicine published recently that deserves and will get more careful reading and study than this book will receive, and as a book of reference it will be invaluable to every man who practices surgery.

AN INTRODUCTION TO DERMATOLOGY. Norman Walker, M. D., F. R. C. P. New York: Wm. Wood & Co.

This introduction was originally a reproduction of a series of lectures delivered to students, and was intended as a guide for undergraduate study. More recently, additions have been made and the work published as a text-book. There is much about the book to be commended. It is written in a very pleasing style, more as a discussion than as a formal treatise. The commoner diseases of the skin are discussed in detail, while the rarer ones, of interest only to the specialist, are considered very briefly or not at all. The colored plates, of which there are a large number, deserve special praise, as they are well selected and beautifully executed. The present edition is down to the minute and is recommended as a shorter text or reference book.

THE MEDICAL DISEASES OF CHILDREN. By Reginald Miller. Bristol, England: John Wright & Sons, Ltd., 1911.

This is a book of between 500 and 600 pages very concisely and completely gotten up. Illustrations are appropriate and original. The most striking thing to an American reader is the very simple way in which the subject of infant feeding is treated, in quite pleasing contrast to the complicated formulæ so unnecessarily advocated in American text-books on the subject.

The section on infections deserves special attention, especially those chapters relating to pneumococcic infection, rheumatic infection, and tuberculosis. There is a chapter of several pages devoted to pyloric stenosis. The last section on nervous diseases is short but complete. Following the main body of the text are two appendices, the first devoted to the study of preparation of food for diets in infancy; the second to hospital regulations. On the whole the book is deserving of wide spread recognition.

C. G. GRULEE.

GYNECOLOGY. The Practical Medicine Series, Vol. IV. Edited by Emilius C. Dudley, A. M., M. D., and C. von Bachelle, M. S., M. D. Chicago: The Year Book Publishers, 1910.

The fourth volume of this now well known series of the year book presents its material according to the arrangement obtaining in the previous issues. The authors have gleaned the literature effectually and have collaborated on a brief analysis of recent opinion and advance that should be of great value to the general practitioner for whom, indeed, the year book series is intended.

In part V, devoted to displacements and their treatment by plastic operative procedure, and in part VI, the disorders of menstruation, this value is particularly brought out. The arrangement of the material, excellent formulation in brief, and the constant editorial comment bring the volume up to the high standard already set by the collaborators.

CAREY CULBERTSON.

CLINICAL CONGRESS OF SURGEONS OF NORTH AMERICA

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Second Annual Meeting, Philadelphia, November 7 to 16, 1911

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THE PHILADELPHIA MEETING

JUDGING from the large number and the enthusiastic tone of letters being received at the office of the General Secretary, we may safely predict that the attendance at the Philadelphia meeting will greatly exceed that of the Chicago meeting last November when the total registration ran well over the one thousand mark, and that every state in the United States, every province of Canada, Mexico, and even the distant possessions of the United States will be represented.

The capacity of the amphitheaters and operating rooms of the various Philadelphia hospitals is such that from 1,500 to 2,000 visitors can be comfortably cared for each day, and, as at the Chicago meeting, it is not expected that all the visiting surgeons will be in attendance on any one day. The Philadelphia hotels have already booked a large number of advance reservations and the Committee on Arrangements advise an early reservation of accommodations by those who can determine in advance the exact days that they will be in attendance.

It will be noted by looking over the clinical program presented on the following pages that every hour of each day from 8 A. M. until 5 P. M. is fully covered by a number of clinics. While the clinical program as published is as nearly accurate as it is possible to outline such a program, it is subject to change, and a great many special features are still to be added. As there will be a complete change of program from day to day, both as to operators and clinical material, it will be necessary for each one in attendance to go to headquarters each day, where late in the afternoon the program for the following day will be bulletined.

In the October issue there will appear a detailed statement as to the arrangements for registration, issuing of tickets of admission to the various clinics, rates of railway fare, and other information of interest to those who desire to attend.

At about the same date the invitations will be sent out to the subscribers to SURGERY, GYNECOLOGY AND OBSTETRICS and to a selected list of surgeons who are interested in the movement and wish to become members of the Congress. To the latter list can be added the names of other surgeons who may be interested if their names and addresses are sent to Dr. Franklin H. Martin, General Secretary, 1210 Columbus Memorial Building, Chicago.

THE CLINICAL PROGRAM

PRELIMINARY OUTLINE OF THE CLINICS, WHICH WILL BE REVISED EACH MONTH UNTIL COMPLETE

HOSPITAL OF THE UNIVERSITY OF PENNSYLVANIA

C. H. Frazier	Clinical demonstrations. Laboratory demonstrations.
Edward Martin	Open treatment of fractures. Urinary calculi. Vasa-epididymostomy.
B. A. Thomas	Results of cases treated, and a demonstration of dessication by the monopolar high frequency current of surface growths and hollow viscera neoplasmata, benign and malignant.
G. G. Davis	Treatment of tuberculous disease of hip and spine; congenital luxation of hip; paralysis from anterior poliomyelitis; operations for ankylosed and flail joints.
T. T. Thomas	Shoulder injuries, two new operations.
John B. Deaver	Operations on the appendix, stomach and gall passages.
George Fetterholf	Clinical anatomy of thorax.
E. H. Siter	Genitourinary technique.
A. A. Uhle	Renal insufficiency.
W. H. Mackinne	Urethroscope.
John L. Laird	Cystoscope and catheterizing ureters.
Alfred C. Wood and E. E. Eliason	Instruments: (*a*) Demonstration of a tourniquet for the control of hæmorrhage from the scalp during operations on the skull or brain. (*b*) Osteoplastic resection of the skull by means of an instrument operated by hand. Technique: A method of exposing the spinal laminæ.
J. B. Carnett	Hernia: with operations, inguinal, femoral, and umbilical. Typhoid perforation and treatment.
C. C. Norris	Treatment of sterility and dysmenorrhœa by means of a new form of stem pessary. Review of all cases of latter condition. Gonorrhœa in women.
Barton Cooke Hirst	Technique of hysterectomy for various indications; vaginal and abdominal hysterectomies; operative treatment of obstructed labors and placenta prævia; repair of the genital canal.
W. R. Nicholson	Methods of intrauterine bacteriological examination.
R. Tait McKenzie	Treatment of flat foot, round shoulders, lateral curvature, or hernia, by exercise.
H. K. Pancoast	Stereoscopic work.
George E. de Schweinitz and J. T. Carpenter	Surgery of the eye.
T. B. Halloway, Carl Williams and H. Maxwell Langdon	Demonstration of special methods of diagnosis.
J. E. Sweet and Edward Martin	Open treatment of fractures. Arterial suture. Vascular anastomosis.
George P. Muller	Demonstration of patients operated upon for various joint lesions: tuberculous arthritis, ankylosis, rheumatoid arthritis, etc. Demonstration of certain malpositions and anomalies of the gastrointestinal tract with special reference to ptosis. Effect of salt solution, introduced intravenously, upon hæmolysis. Demonstrations in surgical pathology.
C. P. Grayson	Demonstration of correction of deflections of the nasal septum, with local, followed by general anæsthesia. Tonsillectomy versus tonsillotomy. The intranasal surgery of the accessary sinuses.
B. A. Randall and Ralph Butler	Radical tympanomastoid exenteration for middle ear caries. Surgical anatomy of the temporal bone. (Demonstration with specimens and lantern.) Diagnostic tests in otologic practice. The best every day treatment of chronic catarrhal and suppurative ear disease.
Brooke M. Anspach	Perineal operations with adaptation of subcuticular suture.
Floyd E. Keene	Diagnosis of renal tuberculosis.
John G. Clark	Surgical phases of enteroptosis and other current clinica material.

KENSINGTON HOSPITAL

H. C. Deaver	Gynecological clinic; November 9 and 13, 2 to 5 P. M.

PENNSYLVANIA HOSPITAL

W. E. Lee	Surgical technique of the hospital. Surgery of the peritoneum; acute, localized, and diffuse inflammations; tubercular peritonitis. Cystoscopic examinations. Fractures and dislocations. Nov. 7, 13 and 15, 10 A. M.; Nov. 13, 3 to 4 P. M.
Robert G. Le Conte	Tubercular glands of the neck; goiter. Surgery of the female perineum. Acute inflammations of bone. Nov. 7, 11 to 1; Nov. 11, 12 to 1; Nov. 16, 11:30 to 1.
Drs. Packard and Coates	Surgery of the ear, nose and throat. Nov. 7, 2 to 4.
Francis A. Packard	Surgical diseases of the ear. Nov. 15, 2 to 4.
W. T. Longcope	Surgical pathology. Nov. 8, 10 A. M.
John H. Gibbon	Hernia; inguinal femoral, umbilical. Malignant diseases; tumors of the breast. Surgery of the kidney, ureter and bladder. Nov. 8, 11 to 1; Nov. 13, 11:30 to 1; Nov. 15, 11 to 1.
Drs. Schwenk and Shoemaker	Surgery of the eye. Nov. 8 and 13, 2 P. M.
Drs. Allen and Ashhurst	Fractures and dislocations. Nov. 9 and 10, 10 A. M.
Edward B. Hodge	Traumatic surgery of the lung. Club foot and tendon transplantation. Nov. 9, 11:30 to 1; Nov. 16, 10 to 11:30.
Francis T. Stewart	Surgery of the heart and pericardium; thoracic aneurysm. Surgery of blood-vessels. Nov. 9, 2 to 4; Nov. 14, 11:30 to 1.
Arthur E. Billings	Surgery of the female pelvis. Nov. 10, 11:30 to 1.
Drs. Eves and Scarlet	Surgery of the ear, nose and throat. Nov. 10, 2 to 4.
Charles F. Mitchell	Surgery of the intestine; typhoid perforations. Surgery of the upper abdomen. Nov. 11 and 14, 10 A. M.
Charles N. Davis	Surgical diseases of the skin. Nov. 14, 2 to 4.

JEFFERSON HOSPITAL

Orville Horwitz and Hiram R. Loux	Genitourinary clinic; alternate days; 1 to 2 P. M.
W. F. Hansel and William M. Sweet	Eye clinic; Nov. 8, 9 and 10; 2:30 to 4 P. M.
J. Chalmers Da Costa and Charles F. Nassau	Surgical clinic; Nov. 8, 10, 13, and 15; 1 P. M.
John H. Gibbon	Surgical clinic; Nov. 7, 11, and 14; 1 to 3 P. M.
H. Augustus Wilson	Orthopedic clinic; Nov. 7, 9, 11, 14, and 16; 10 to 11 A. M.
E. E. Montgomery and J. M. Fisher	Gynecological clinic; daily; 9 to 11 A. M.
S. McCuen Smith	Otological clinic; Nov. 8, 10, 13, and 15; 1 to 2 P. M.
Edward P. Davis	Obstetrical clinic; daily; 4 to 5 P. M.
D. Braden Kyle	Laryngological clinic; Nov. 7, 9, 11, 14 and 16; 1 P. M.
Willis F. Manges	X-ray clinic; daily; 1 to 2 P. M.

PRESBYTERIAN HOSPITAL

George Strawbridge	Surgery of the eye. Nov. 7, 2 to 4 P. M.
W. S. Newcomet	X-ray therapeutics. Nov. 7, 2 to 4 P. M.
John H. Girvin	Gynecological clinic. Nov. 8, 2 to 4 P. M.
H. R. Wharton	Surgical clinic. Nov. 9, 2 to 4 P. M.
George Erety Shoemaker	Gynecological clinic. Nov. 10, 2 to 4 P. M.
D. B. Pfeiffer	Surgical pathology. Nov. 10, 2 to 4 P. M.
E. B. Hodge	Surgical clinic. Nov. 11, 2 to 4 P. M.
John H. Jopson	Surgical clinic. Nov. 13, 2 to 4 P. M.
George C. Stout and A. H. Cleveland	Ear, nose and throat clinic (surgical). Nov. 14, 2 to 4 P. M.
Frank C. Knowles	Surgical diseases of the skin. Nov. 14, 2 to 4 P. M.
William D. Rodman	Surgical clinic. Nov. 15, 2 to 4 P. M.
Richard F. Woods	Gynecological clinic. Nov. 15, 2 to 4 P. M.

PHILADELPHIA LYING-IN CHARITY HOSPITAL

G. M. Boyd	Obstetrical clinic; Nov. 10, 12 to 1.
Stricker Coles	Obstetrical clinic; Nov. 14, 12 to 1.

PHILADELPHIA GENERAL HOSPITAL

Wilmer Krusen	Obstetrical clinic; November 7, 11 to 1 P. M.
H. M. Christian	Genito-urinary clinic; November 7, 2 to 4 P. M.
Walter Roberts	Laryngological clinic; November 7, 4 to 6 P. M.
H. A. Wilson	Orthopedic clinic; November 8 and 10, 9 to 11 A. M.
Joseph W. Hearn	Surgical clinic; November 8 and 15, 11 to 1 P. M.
E. H. Siter	Genito-urinary clinic; November 8, 2 to 4 P. M.
George E. de Schweinitz	Eye clinic; November 8 and 15, 4 to 6 P. M.
J. B. Carnett	Surgical clinic; November 9, 9 to 11 A. M.
W. J. Roe	Oral surgery clinic; November 9 and 16, 11 to 1 P. M.
M. B. Hartzell	Dermatological clinic; November 9, 2 to 4 P. M.
Ernest Laplace	Surgical clinic; November 9, 4 to 6 P. M.
George P. Muller	Surgical clinic; November 10, 9 to 11 A. M.
Frank D. Dickson	Orthopedic clinic; November 10, 11 to 1 P. M.
E. P. Davis	Gynecological and Obstetrical clinic; November 10, 2 to 4 P. M.
J. C. Knipe	Eye clinic; November 10, 4 to 6 P. M.
Henry Tucker	Genito-urinary clinic; November 11, 9 to 11 A. M.
L. W. Steinbach	Surgical clinic; November 11, 11 to 1 P. M.
M. P. Warmuth	Surgical clinic; November 11, 2 to 4 P. M.
W. M. Sweet	Eye clinic; November 11, 4 to 6 P. M.
William L. Rodman	Surgical clinic; November 13, 9 to 11 A. M.
M. H. Cryer	Oral surgery clinic; November 13, 11 to 1 P. M.
M. B. Miller	Surgical clinic; November 13, 2 to 4 P. M.
B. M. Anspach	Gynecological clinic; November 13, 4 to 6 P. M.
T. T. Thomas	Surgical clinic; November 14, 9 to 11 A. M.
Ella B. Everitt	Obstetrical clinic; November 14, 11 to 1 P. M.
H. R. Loux	Surgical clinic; November 14, 2 to 4 P. M.
Alexander Uhle	Genito-urinary clinic; November 14, 4 to 6 P. M.
George M. Boyd	Obstetrical clinic; November 15, 9 to 11 A. M.
R. C. Norris	Obstetrical clinic; November 15, 2 to 4 P. M.
H. K. Gaskill	Dermatological clinic; November 16, 2 to 4 P. M.
Hershey Thomas	Surgical clinic; November 16, 4 to 6 P. M.

SAMARITAN HOSPITAL

Wilmer Krusen	Gynecological clinic. Nov. 8, 11 and 15; 12 M.
Guthrie McConnell	Demonstration of the surgical pathology of malignant tumors. Nov. 8, 2 P. M.
Collier Martin	Rectal clinic. Demonstration of results obtained in the treatment of fistula in ano. Nov. 8 and 15, 3 P. M.
W. Wayne Babcock	Surgical clinic with demonstration of segment anæsthesia by intradural injection. Demonstration of plastic or reconstructive surgery. Nov. 8 and 15, 4 P. M.; Nov. 11, 3 P. M.
Harry G. Duncan	Demonstration of cystoscopy and ureteral catheterization. Nov. 9, 1 P. M.
Nathan G. Ward	Use of high frequency currents and static wave current in the treatment of diseases of nose and throat. Nov. 9, 2 P. M.
Harry Hudson	Orthopedic clinic. Nov. 9, 4 P. M.
William H. Hitschler	Ear, nose and throat clinic. Demonstration of excision of the facial and pharyngeal tonsils. Nov. 10, 3 to 4; Nov. 13, 2:30 P. M.
William E. Robertson	Surgical errors in the diagnosis of intra-abdominal disease. Nov. 10, 4 P. M.
A. Parker Hitchens	Preparation of bacterial vaccines. Application of bacterial vaccines and allied products in surgical therapeutics. Nov. 10, 5 P. M.; Nov. 15, 2 P. M.
C. E. de M. Sajous	The rôle of the ductless glands in relation to surgical therapeutics, Nov. 11, 2 P. M.
William A. Steel	Genitourinary clinic, Nov. 13, 4 P. M.
J. F. Schamberg	Stereopticon demonstration of syphilis with special reference to the newer therapy. Nov. 13, 5 P. M.
Wendel Reber	Ophthalmic operative clinic. Nov. 14, 3 P. M.

POLYCLINIC HOSPITAL

B. F. Baer	Gynecological clinic. Nov. 7 and 14, 2 P. M.
L. H. Adler	Rectal clinic. Nov. 7, 1 P. M.; 13, 2 P. M.
J. M. Baldy	Pelvic inflammatory disease. Uterine displacements and fibroid tumors. Nov. 9 and 16, 10 A. M.
John B. Roberts	Surgical clinic. Demonstration of plastic operations on cadaver (laboratory). Plastic surgery of the face, exhibiting operations and results. Nov. 9 and 16, 11 A. M.
J. B. Roberts and L. W. Steinbach	Surgical clinic. Nov. 11, 11 A. M.
F. R. Packard	Nose and throat clinic. Operations on the accessary sinuses. Demonstration in tracheobronchoscopy. Nov. 8 and 15, 3 P. M.
G. M. Dorrance and N. Ginsberg	Demonstration of transfusion methods (laboratory). Nov. 10, 10 A. M.
G. M. Dorrance	Demonstrations in operative gynecology (laboratory). Nov. 10, 3 P. M.; Nov. 16, 1 P. M.
R. Butler	Demonstration in operative surgery of the ear and mastoid (laboratory). Nov. 8 and 15, 4 P. M.
W. Reber	Ophthalmological clinic. Nov. 8, 1 P. M.
E. L. Vansant	Nose and throat clinic. Submucous operations for deviation of the nasal septum. Nov. 8 and 15, 12 M.
J. A. Kelly	Demonstration in surgical pathology. Nov. 9, 1 P. M.; Nov. 13, 12 M.
J. F. Schamberg	Dermatological clinic. Exhibition of cases of lupus and skin cancer treated by X-ray and other methods. Treatment of angiomata and other nævi by solid carbon dioxide. Nov. 7 and 11, 12 M.
A. Hewson	Demonstration in regional and surgical anatomy. Nov. 7, 3 P. M.; Nov. 14, 12 M.
L. W. Steinbach	Surgical clinic. Surgery of the thyroid gland. Nov. 7 and 14, 11 A. M.
J. H. Jopson and J. Speese	Surgical clinic. Treatment of pulmonary tuberculosis by nitrogen injections. Nov. 8, 11 A. M.
J. H. Jopson	Surgical clinic. Nov. 15, 11 A. M.
C. L. Leonard	Demonstration in X-ray laboratory. Rapid stereoroentgenology. Nov. 7, 4 P. M.; Nov. 11, 1 P. M.; Nov. 14, 3 P. M.
A. A. Sargent	Demonstration in refraction. Nov. 7 and 14, 10 A. M.
W. Roberts	Aural clinic. Nov. 8 and 15, 2 P. M.; Nov. 13, 1 P. M.
William R. Nicholson	Gynecological clinic. Cystoscopy and ureteral catheterization. Nov. 8, 11 and 15, 10 A. M.
M. B. Miller	Surgical clinic. Hernia. Demonstration in operative surgery. Methods of intestinal anastomosis (laboratory). Nov. 10 and 13, 11 A. M.
J. K. Young	Orthopedic clinic. Diagnosis and treatment of infectious arthritis. Tendon transplantation for infantile paralysis; Lange's operation. Nov. 9 and 16, 2 P. M.
A. W. Watson	Nose and throat clinic. Nov. 9 and 16, 3 P. M.
W. M. Sweet	Ophthalmological clinic. Ocular injuries by foreign bodies. Nov. 10, 1 P. M.
W. M. Sweet and C. R. Heed	Demonstration in operative ophthalmology (laboratory). Nov. 11 and 15, 1 and 4 P. M.
J. P. Tunis	Demonstration in operative surgery of throat and nose (laboratory). Nov. 11, 3 P. M.; Nov. 16, 4 P. M.
B. A. Thomas	Genitourinary clinic. Chromoureteroscopy, demonstrating carmine test. Intravenous use of salvarsan. Functional kidney diagnosis by the Duboscq colorimeter. The Wasserman technique. Nov. 10 and 14, 4 P. M.
W. C. Posey	Ophthalmological clinic. Nov. 9, 4 P. M.
M. B. Miller, R. M. Goepp and J. A. Kelly	Arteritis obliterans. Exhibition of patients and specimens. Nov. 10, 12 M.
J. Thorington	Refraction. Nov. 10, 2 P. M.
G. M. Coates	Aural clinic. Nov. 11, 2 P. M.
J. S. Gibb	Nose and throat clinic. Tonsillectomy by modern methods. Nov. 13, 3 P. M.
G. H. Makuen	Faulty operations on the tonsils, and their effect on the soft palate and the voice. Nov. 13, 4 P. M.
T. Erck	Gynecological clinic. Nov. 14, 1 P. M.

WOMAN'S HOSPITAL OF PHILADELPHIA

SARAH H. LOCKREY	Gynecological clinic; November 7 and 16, 10 A. M.
EMMA E. MUSSON	Yankauer's Eustachian Tube work; November 7, 2 P. M. Bronchoscopic and Esophageal Tube work; November 14, 2 P. M.
CAROLINE M. PURNELL	Gynecological clinic; November 8 and 15, 10 A. M.
MIRIAM BUTT	Eye clinic; November 8 and 15, 2 P. M.
KATE W. BALDWIN	Surgical clinic; November 9, 10 A. M. Beeswax in Bone Cavities and in Cavities of the Soft Tissues; November 11; 2 P. M.
MARY W. GRISCOM	Obstetrical clinic; November 9, 1 P. M.
MARIE K. FORMAD	Panhysterectomy; November 10, 10 A. M. Gynecological clinic; November 14, 10 A. M.
MARGARET F. BUTLER	Submucous Resection; November 10, 2 P. M. Removal of Tonsils and Adenoids; November 13, 2 P. M.
CATHARINE MACFARLANE	Cystoscopy and Bier's Hyperemia; November 11, 10 A. M.
FRANCES R. SPRAGUE	Surgical clinic; November 13, 10 A. M.
MARY GETTY	Eye clinic; November 16, 2 P. M.

HOSPITAL OF THE WOMAN'S MEDICAL COLLEGE

ELLA B. EVERITT	Gynecological clinic. Nov. 7, 9, 14 and 16, 1 P. M.
MARGARET F. BUTLER	Laryngological and rhinological clinic. Nov. 8 and 15, 2 P. M.
HARRY C. DEAVER	Surgical clinic. Nov. 10, 1 P. M.
EMMA E. MUSSON	Aural clinic. Nov. 13, 2 P. M.

CHILDREN'S HOSPITAL

H. R. WHARTON	Surgical clinic. Nov. 7.
F. R. PACKARD	Nose and throat clinic. Nov. 8.
B. A. RANDALL	Ear clinic. Nov. 9.
J. H. JOPSON	Surgical clinic. Nov. 10.
W. C. POSEY	Eye clinic. Nov. 11.
E. B. HODGE	Surgical clinic. Nov. 13.
F. K. KNOWLES	Surgical skin affections. Nov. 14.
J. A. BABBITT	Nose and throat clinic. Nov. 15.
C. Y. WHITE	Surgical pathology. Nov. 16.

STETSON HOSPITAL

LEWIS S. SOMERS	Ear, nose and throat clinic; Nov. 8 and 13; 12 to 1.
ISAAC LEOPOLD	Eye clinic; Nov. 10 and 14; 12 to 1.
STEPHEN E. TRACY	Catheterization of ureters; Nov. 8, 12:30 to 1:30. Gynecological clinic (days to be announced later).
JOHN A. BOGER	Surgical clinic; Nov. 13 and 15; 1.
B. M. ANSPACH	Gynecological clinic; Nov. 7, 9, 11, 14; 12 to 1.
W. B. ODENATT	Case of enlarged thymus in child of four months; case of situs viscerum inversus; intragastric faradism in gastric atony; Nov. 8 and 11; 12 to 1.
CARLE LEE FELT	Ear, nose and throat clinic; Nov. 9 and 14; 12 to 1.
GEORGE G. ROSS	Surgical clinic; Nov. 7, 9, 11 and 14; 12 to 1.

CHILDREN'S HOMEOPATHIC HOSPITAL

H. S. WEAVER, F. W. SMITH and OSCAR SEELEY	Ear, nose and throat clinics; Nov. 9 and 16, 2:30 to 5.
L. W. THOMPSON	Surgical clinic; Nov. 9 and 16, 2:30 to 5.

ST. LUKE'S HOMEOPATHIC HOSPITAL

D. ROMAN	Goiter; Nov. 11 and 14, 2:30 to 5.

MEDICO-CHIRURGICAL HOSPITAL

ERNEST LAPLACE	Surgical clinic; Nov. 7 and 11; 11 to 1 P. M.; Nov. 13 and 15; 9 to 11 A.
H. M. CHRISTIAN	Genitourinary clinic; Nov. 8 and 15; 11 A. M. to 1 P. M.
W. L. RODMAN	Surgical clinic; Nov. 8, 10, 14 and 16; 9 to 11 A. M.
J. P. MANN	Orthopedic clinic; Nov. 9 and 14; 11 to 12 A. M.
W. E. ASHTON	Gynecological clinic; Nov. 9 and 14; 12:30 to 2 P. M.
L. W. FOX	Eye clinic; Nov. 10 and 13; 1 to 3 P. M.
E. B. GLEASON	Otological clinic; Nov. 10 and 15; 3 to 4 P. M.
S. C. BURNS	Oral surgical clinic; Nov. 11; 9 to 10 A. M.
G. M. BOYD	Obstetrical clinic; Nov. 13; 12 to 1 P. M.
A. H. CLEVELAND	Nose and throat clinic; Nov. 16; 12 to 2 P. M.

METHODIST EPISCOPAL HOSPITAL

J. B. ROBERTS	Surgical clinic. Nov. 7, 12 to 2; Nov. 14, 11 to 2.
JOSEPH SPELLISY	Surgical clinic. Nov. 9 and 16, 11 to 12 A. M.
J. T. RUGH	Orthopedic clinic. Nov. 8, 10 and 13, 11 to 12 A. M.
WALTER ROBERTS	Otological and laryngological clinic. Nov. 9 to 16, 1 to 4 P. M.
L. T. HAMMOND	Surgical clinic. Nov. 8, 10 and 13, 12 to 2 P. M.
J. P. MOORE	Ophthalmological clinic. Nov. 9 and 16, 4 P. M.
R. C. NORRIS	Gynecological clinic. Nov. 14, 2 P. M.
L. A. SALADE	Gynecological clinic. Nov. 13, 2 P. M.

ST. JOSEPH'S HOSPITAL

J. M. SPELLISY	Surgical clinic, Nov. 7, 9, and 14; 1 P. M,
M. M. FRANKLIN	Surgical clinic, Nov. 7, 9, and 14; 9 A. M.
C. F. NASSAU	Surgical clinic, Nov. 7, 9 and 14; 3 P. M,
E. E. MONTGOMERY	Gynecological clinic, Nov. 7, 10 and 14, 11 A. M.
P. B. BLAND and F. H. MAIER	Gynecological clinic, Nov. 8, 9, 11, 13, 15 and 16; 11 A. M.
S. L. ZIEGLER and P. J. PONTIUS	Ophthalmological clinic, Nov. 8, 10 and 15, 4 P. M.
DR. JONES	Ophthalmological clinic, Nov. 9, 11, 14 and 16, 4 P. M.
G. M. MARSHALL	Ear, nose and throat clinic, Nov. 7, 8, 11, 14 and 15, 9 A. M.
DR. SENDERS	X-ray clinic. Daily at noon.

HOWARD HOSPITAL

BARTON COOKE HIRST	Gynecological clinic; Nov. 7 and 14.
ALFRED C. WOOD	Surgical clinic; Nov. 10, 12:30 P. M.
W. C. POSEY	Ophthalmological operations; Nov. 13, 2 P. M.
GEORGE B. WOOD	Tonsillectomy; accessory sinus disease; straightening of crooked nasal septum; mastoid operation, etc.; Nov. 9 and 16, 2 P. M.

WILLS EYE HOSPITAL

P. J. PONTIUS, M. RADCLIFFE, S. L. ZIEGLER, C. BERENS, S. D. RISLEY, F. FISHER, W. C. POSEY, P. N. K. SCHWENK and W. ZENTMAYER	Operative clinics daily; 2 to 3 P. M.

JEWISH HOSPITAL

W. H. TELLER, E. L. KLOPP, L. W. STEINBACH and DR. STERN	Surgical clinics.
E. L. KLOPP and S. M. SMITH	Otological clinics.
A. W. WATSON	Laryngological clinics.
W. G. ELMER	Orthopedic clinics.
ISAAC LEOPOLD and J. C. KNIPE	Ophthalmological clinics.

ORTHOPEDIC HOSPITAL

WILLIAM J. TAYLOR	Cases of operation for brain tumors; cerebellar cyst. Discussion of laminectomy for Pott's disease; operation for exophthalmic goiter.
GWILYM G. DAVIS	Tendon transplantation; cases of arthroplasty, arthrodosis; cases illustrative of treatment of club-foot, tuberculous disease of joints, etc.

HAHNEMANN HOSPITAL

Surgical Clinics — Nov. 8 and 15, 2:30 to 5.

W. B. Van Lennep	Prostatectomy; hernia.
H. L. Northrop	Goiter; appendix.
G. A. Van Lennep	Stomach and gall-bladder.
H. P. Leopold	Open treatment of fractures.
W. N. Hammond	Club foot; tendon transplantation.
J. D. Elliott	Breast tumors.
C. A. Bigler, Jr.	Hæmorrhoids; fistula; other current clinical material.

Gynecological and Obstetrical Clinics — Nov. 11, 2:30 to 5; Nov. 16, 10:30 to 1.

D. B. James	Pelvic inflammatory disease; fibroids.
N. F. Lane	Uterine displacements.
J. E. James, Jr.	Obstetrical demonstration; repair of genital canal.

Eye, Ear, Nose and Throat Clinics — Nov. 8, 11 and 15, 2:30 to 5.

W. W. Speakman	Operations on the eye.
F. W. Smith and Oscar Seeley	Demonstration of tracheo-bronchoscopy and œsophagoscopy.
I. G. Shallcross and H. S. Weaver	Surgery of the accessory sinuses; nose and throat clinic.
G. J. Palen	Radical mastoid operation.

GERMAN HOSPITAL

John B. Deaver	Surgical clinic every otherday.

GYNECEAN HOSPITAL

J. M. Baldy	Supravaginal hysterectomy with anchorage of the cervix to the round ligaments in connection with plastic operations for uterine prolapse. Suspension of the uterus by posterior attachment of the round ligaments. Hysterectomy for carcinoma of the cervix. Hysterectomy for fibroid tumor of the uterus. Nov. 8 and 13, 10 A. M.
Henry D. Beyea	Suspension of the stomach for gastroptosis by plication of the gastro-hepatic omentum. Supravaginal resection of the uterus for fibroid tumor, with conservation of a part of the endometrial cavity and the ovaries. Nov. 9, 10 A. M.
Theodore Erck	Suspension of the kidney. Hysterectomy for pelvic inflammatory disease. Nov. 10, 10 A, M.
Brooke M. Anspach	Cystoscopic examination and catheterization of the ureters. Vesico-vaginal interplacement of the uterus for cystocele and prolapse. Resection of excessive fat from the abdominal wall in connection with operation for ventral hernia. Nov. 11, 10 A. M.
George W. Outerbridge	Demonstration of interesting gynecological specimens. Nov. 14, 10 A. M. Demonstration of specimens removed at each operation and other specimen sbearing on cases of the day, daily.

EPISCOPAL HOSPITAL

H. C. Deaver	Surgery of the female pelvis. Nov. 7, 2 to 4 P. M.
Louis Mutschler	Surgery of hernia. Nov. 8, 2 to 4 P. M.
T. R. Neilson	Surgery of the urinary tract. Nov. 9, 2 to 4 P. M.
G. Oram Ring	Surgical diseases of the eye. Nov. 10, 2 to 4 P. M.
Charles H. Frazier	Surgery of the stomach and duodenum. Nov. 11, 2 to 4 P. M.
C. Y. White	Vaccine therapy. Nov. 13, 2 to 4 P. M.
C. C. Biedert	Surgical diseases of the ear, nose and throat. Nov. 14, 2 to 4 P. M.
A. P. C. Ashhurst	End results of fracture of the femur. Nov. 15, 2 to 4 P. M.
J. L. Bromley	Surgical diseases of the eye. Nov. 16, 2 to 4 P. M.

EVENING LITERARY SESSIONS

Wednesday, November 8th

PHILADELPHIA COUNTY MEDICAL SOCIETY — In Mitchell Hall, College of Physicians, at 8:15 P.M.

SURGERY OF THE UPPER ABDOMEN

1. Surgical Pathology of the Stomach and Duodenum J. F. BINNIE, M. D., Kansas City, Missouri.
   Discussion opened by W. L. RODMAN, M. D., Philadelphia.
2. Surgery of the Liver and Bile Ducts . . . GEORGE EMERSON BREWER, M. D., New York City.
   Discussion opened by ROBERT G. LECONTE, M. D., Philadelphia.
3. Surgery of the Pancreas . . . . . MAURICE H. RICHARDSON, M. D., Boston.
   Discussion to be opened by JOHN B. DEAVER, M. D., Philadelphia.

Thursday, November 9th

PRESIDENTIAL MEETING — In the Ball Room of the Bellevue-Stratford, at 8:15 P. M.

President's Address: Co-ordination of Undergraduate and Postgraduate Teaching of Clinical Surgery . . . . . ALBERT J. OCHSNER, M. D., Chicago.

The Technique and Remote Results of Blood-vessel Anastomoses (Lantern Demonstration) . . . . . ALEXIS CARREL, M. D., New York City.

Cancer of the Stomach; Its Surgical Cure (Lantern Demonstration) . . . . . WILLIAM J. MAYO, M. D., Rochester, Minn.

Friday, November 10th

PHILADELPHIA NEUROLOGICAL SOCIETY — In Mitchell Hall, College of Physicians, at 8:15 P. M.

The Technique and Results of Deep Injections of Alcohol for Ticdouloureux . . . . . HUGH T. PATRICK, M. D., Chicago.
Discussion to be opened by F. X. DERCUM, M. D., Philadelphia.

Surgery of the Pituitary Body . . . . . HARVEY CUSHING, M. D., Baltimore.

Operative Treatment of Experimental Lesion of the Spinal Cord Equivalent to the Crush Injury of Fracture Dislocation of the Spinal Column . . ALFRED REGINALD ALLEN, M. D., Philadelphia.
Discussion to be opened by CHARLES H. FRAZIER, M. D., Philadelphia.

Monday, November 13th

PHILADELPHIA ACADEMY OF SURGERY — In Mitchell Hall, College of Physicians, at 8:15 P. M.

Some Observations on the Thyroid Gland and Its Diseases, CHARLES H. MAYO, M. D., Rochester, Minn.
Discussion to be opened by FRANCIS J. SHEPHERD, M. D., Montreal, Quebec.

The Operative Treatment of Fractures . . . . . JOSEPH A. BLAKE, M. D., New York City.
Discussion to be opened by EDWARD MARTIN, M. D., Philadelphia.

The Significance of Blood in the Stools . . . . . J. M. T. FINNEY, M. D., Baltimore.
Discussion to be opened by MAURICE H. RICHARDSON, M. D., Boston, Mass.

Tuesday, November 14th

PEDIATRIC SOCIETY OF PHILADELPHIA — In Mitchell Hall, College of Physicians, at 8:15 P. M.

THE SURGERY OF CHILDHOOD

1. Pyloric Stenosis in Infancy, its Surgical Treatment (Lantern demonstration) . . . . . CHARLES L. SCUDDER, M. D., Boston.
2. Some Differences between the Surgery of Children and Adults . . . . . CHARLES N. DOWD, M. D., New York City.
3. A Paper on Orthopedic Surgery. . . . . R. TUNSTALL TAYLOR, M. D., Baltimore.

Wednesday, November 15th

OBSTETRICAL SOCIETY OF PHILADELPHIA — In Mitchell Hall, College of Physicians, at 8:15 P. M.

Surgery of the Tubes and Ovaries . . . . . EDWARD REYNOLDS, M. D., Boston.
The Treatment of Ectopic Gestation . . . . . EDWARD B. CRAGIN, M. D., New York City.
The Circulation of Fibroid Tumors (Lantern Demonstration) JOHN A. SAMPSON, M. D., Albany, N. Y.

COMBINED MEETING OF THE SECTIONS ON OTOLOGY, LARYNGOLOGY AND OPHTHALMOLOGY
In Thompson Hall, College of Physicians, at 8:15 P. M.

The Surgery of the Sinuses and Its Relation to Orbital Complications . . . . . JOSEPH H. BRYAN, M. D., Washington, D. C.
The Relation between Otitic and Intracranical Diseases . GORHAM BACON, M. D., New York City.
The Newer Operations for Glaucoma . . . . . JOHN E. WEEKS, M. D., New York City.

PHILADELPHIA HOTELS AND THEIR RATES PER DAY

HOTELS A, American; E, European.	One Person		Two Persons	
	Without Bath	With Bath	Without Bath	With Bath
BELLEVUE-STRATFORD, Broad and Walnut Sts...E	$2.50 up	$3.50 up	$3.50 up	$ 4.50 up
RITTENHOUSE, 22nd and Chestnut Sts.....E	1.50 "	2.00 "	2.50 "	3.00 "
RITTENHOUSE, 22nd and Chestnut Sts.....A	4.00 "	4.50 "	7.50 "	8.00 "
ST. JAMES, 13th and Walnut Sts.....E	2.00 "	2.50 "	3.00 "	3.50 "
WALTON, Broad and Locust Sts.....E	2.00 "	3.00 "	3.00 "	4.00 "
ALDINE, 1914 Chestnut St.....E	2.50-5.00	3.00-5.00	3.50- 6.00	4.00- 6.00
ALDINE, 1914 Chestnut St.....A	4.00-6.00	5.00-6.00	8.00-10.00	10.00-12.00
CONTINENTAL, 9th and Chestnut Sts.....E	1.50 up	2.00 up	2.50 up	3.00 up
NEW BINGHAM, 11th and Market Sts.....E	1.50 "	2.50 "	3.00 "	4.00 "
COLONNADE, 15th and Chestnut Sts.....E	1.50 "	2.00 "	2.50 "	4.00 "
LORRAINE, Broad St. and Fairmount Ave.....E	1.25 "	1.50 "	2.50 "	3.00 "
LORRAINE, Broad St. and Fairmount Ave.....A	3.50 "	.....	.....	.....
RODMAN, 800 North Broad St.....E	.....	1.50 "	.....	3.00 "
NORMANDIE, Chestnut and 36th Sts.....A	3.50 "	4.00 "	6.50 "	7.50 "
GREEN'S, 8th and Chestnut Sts.....E	1.00-1.50	2.00 "	1.50-2.00	3.00 "
STENTON, Broad and Spruce Sts.....E	1.50 up	2.50 "	2.50 up	4.00 "
MAJESTIC, Broad St., above Girard.....E	2.00 "	2.50 "	3.00 "	4.00 "
HANOVER, 12th and Arch Sts.....E	1.00 "	1.50 "	2.00 "	2.50 "

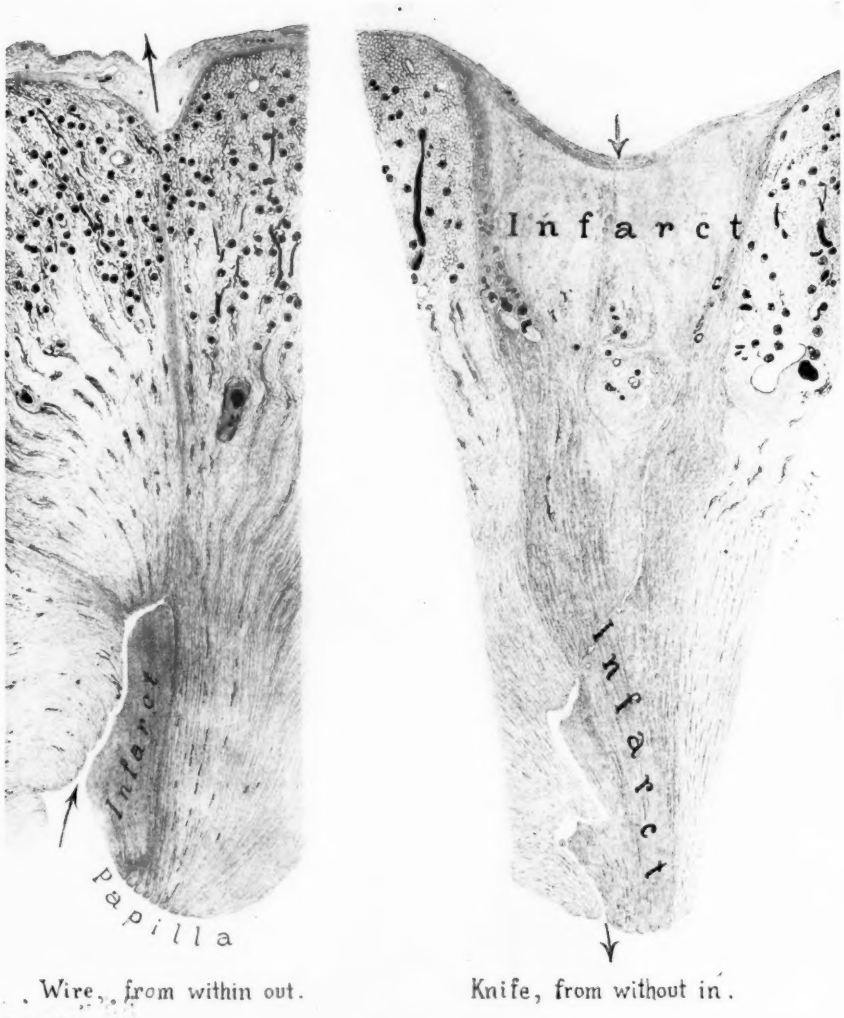

Fig. 1. Section of infarcts in dog's kidneys, magnified 6.5 times, showing the comparative results obtained in the wire and knife incisions, the knife having been passed from cortex to pelvis. The arteries were injected in both cases in order to demonstrate the fine preservation of the blood-vessels in the wire wound. Note the difference in shape and width of the cortical infarct in the two specimens.